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**Monograph**

# The genus *Begonia* (Begoniaceae) in Peru

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**Abstract.** We provide a floristic account for the Begoniaceae of Peru. The family is represented in Peru by 76 species, which are all members of the genus *Begonia* and represent eighteen sections. Twelve new species are described: *B. condorensis* Jara & Moonlight sp. nov., *B. deltoides* Moonlight sp. nov., *B. huancabambae* Moonlight sp. nov., *B. imbrexiformis* Moonlight sp. nov., *B. longinqua* Moonlight sp. nov., *B. longitepala* Moonlight sp. nov., *B. nunezii* Moonlight sp. nov., *B. occultata* J.P.Allen & Moonlight sp. nov., *B. pedemontana* Moonlight sp. nov., *B. serratistipula* Moonlight sp. nov., *B. vargasii* Moonlight sp. nov. and *B. yuracyacuensis* Moonlight sp. nov. We also provide four new records for the country: *B. andina* Rusby, *B. brandbygeana* L.B.Sm. & Wassh., *B. neoharlingii* L.B.Sm. & Wassh. and *B. unilateralis* Rusby. We provide an identification key to all species. The ecology, distribution, and conservation status of all Peruvian *Begonia* species are discussed, including provisional IUCN threat assessments. Most species are illustrated by either historical illustrations, contemporary photographic plates, or line drawings. Twenty-six names are newly synonymised including fifteen previously accepted species, and we designate eighty-three lectotypes, four neotypes, and four epitypes.

**Keywords.** *Begonia*, floristic account, IUCN Red list Assessments, Peru, new species, taxonomy.

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## Introduction

The Begoniaceae is a member of the Cucurbitales and is represented by two genera, *Begonia* L. and *Hillebrandia* Oliv. There is a remarkable disparity in the size of these genera as *Hillebrandia* is monotypic but *Begonia* recently surpassed 2000 species (Hughes *et al.* 2015–ongoing) and is among the ten largest genera of flowering plants (Frodin 2004). *Hillebrandia* is endemic to the Hawaiian archipelago (Clement

*et al.* 2004) but *Begonia* is widespread and found throughout all major tropical regions except Australia and some subtropical regions (Tebbitt 2005). *Begonia* is considered the fastest growing plant genus because species of *Begonia* are being described more rapidly than any other genus (Moonlight *et al.* 2018). Most species of *Begonia* are small to medium sized semi-succulent, perennial herbs but the genus also includes some annuals, climbers, and large, tree-like herbs. The genus is readily distinguished by its combination of alternate, stipulate, and asymmetrical to subsymmetrical leaves; unisexual flowers; and pistillate flowers with an inferior ovary, which is usually three-parted and three-winged.

While it is often trivial to identify plants as a *Begonia*, species-level identification of begonias is more difficult because of the large number of species (Moonlight *et al.* 2018). However, the genus is very morphologically diverse and closely related, morphologically similar species are often geographically isolated from each other. Regional or country-level floristic accounts are therefore key to identifying begonias to species with confidence. For example, there is a recent and excellent floristic account to the begonias of Ecuador (Smith & Wasshausen 1986) and, in the authors' experience, relatively few Ecuadorian *Begonia* specimens in major herbaria are indetermined to species. In contrast, the most recent floristic accounts of the begonias of Peru (Smith & Schubert 1941a) and Bolivia (Smith & Schubert 1944) are older and in need of an update (see below and Moonlight *et al.* 2022). Perhaps because of this, a relatively large percentage of Peruvian and Bolivian *Begonia* specimens are indetermined. For a full understanding of the taxonomy of a large genus such as *Begonia*, revisions of either clades or subgeneric groupings are also necessary. In *Begonia*, species are grouped into sections of which relatively few have been revised (Moonlight *et al.* 2018). However, revisions of sections are limited in their utility for identifying begonias because often only one or a few species in any given area will be members of any given section.

In this current study, we aim to provide a comprehensive floristic account of *Begonia* in Peru. Peru is one of the world's 12 most diverse countries and is home to > 19 000 plant species, of which 7590 (39%) are endemic (Ulloa Ulloa *et al.* 2017). The latest floristic account of *Begonia* in Peru (Smith & Schubert 1941a) included 34 species, but the quantity of taxonomic activity in Andean *Begonia* since this date has rendered it obsolete. Since 1941, 23 species of *Begonia* that occur in Peru have been described and 11 species have been newly recorded for the country. Furthermore, nine of the species names included in the 1941 Flora of Peru account are now treated as synonyms, while one is a misapplied name. The quantity of taxonomic activity in Andean and Peruvian *Begonia* means that an updated floristic account is required to permit the identification of Peruvian *Begonia* specimens with confidence. In this account, we aim to provide the following for all known Peruvian *Begonia* taxa: (i) an identification key; (ii) a full description and, where possible, illustrations or photographic plates; (iii) identification notes; (iv) a full nomenclatural account, including typifications; (v) IUCN red list assessments; (vi) global and Peruvian distributions, and Peruvian distribution maps; (vii) full specimen citations; and (ix) a discussion of their ecology.

## Materials and methods

The floristic account we present here follows a morphological species concept (Cronquist 1978) based upon observations made in the field, in herbaria, from online images of herbarium specimens, and from living plants grown in the collections of the Royal Botanic Gardens Edinburgh. Over 3000 herbarium sheets were examined in the following 36 herbaria: A, AMAZ, B, BM, BRIT, COL, CPUN, CUZ, E, F, G (including G-BOIS and G-DC), GB, GH, HAL, HOXA, HUT, K, L, MA, MBM, MG, MO, MOL (including MOL-WEB), NY, OXF, P, PH, QCE, QCNE, RB, S, TCD, UC, US, USM, and W. Images of all physical specimens observed are held online at the *Begonia* Resource Centre (Hughes *et al.* 2015–ongoing). Descriptions of most species were made from wild or cultivated living plants, supplemented with measurements made from herbarium specimens. Colour information for plants we have been unable to observe growing were taken from specimen labels or photographs provided by

colleagues or freely available on iNaturalist and identified by the first author (iNaturalist, accessed 2020–2021). The description of the genus *Begonia* and all species descriptions were written only with reference to Peruvian plants, specimens, or photographs, except for newly described species also found outside of Peru (*B. pedemontana* Moonlight sp. nov., *B. condorensis* Jara & Moonlight sp. nov., *B. longinqua* Moonlight sp. nov.) and three species where the available Peruvian material did not permit a full description (*B. brandbygeana* L.B.Sm. & Wassh., *B. pastoensis* A.DC., *B. piurensis* L.B.Sm. & B.G.Schub.). Terminology follows the Kew Plant Glossary (Beentje 2012) except for a few exceptions detailed below (see Morphology).

## Morphology

### Habit

The majority of *Begonia* species in Peru and elsewhere are caulescent, medium sized suffrutescent to sub-succulent perennials with an erect stem, rooting only at the base (Tebbitt 2005). This is also true in Peru, where this applies to all species in *B.* sects. *Casparya* (Klotzsch) Warb., *Cyathocnemis* (Klotzsch) A.DC., *Donaldia* (Klotzsch) A.DC., *Pilderia* (Klotzsch) A.DC., *Hydristyles* A.DC., *Lepsia* (Klotzsch) A.DC., *Pritzelia* (Klotzsch) A.DC., and *Ruizopavonia* A.DC., which together account for 30 species. It also applies to several species in the morphologically diverse *B.* sect. *Knesebeckia*. Within this category though, there is a great diversity of size and form. The smallest such *Begonia* is *B. brevicordata* L.B.Sm. & B.G.Schub., which reaches only 40 cm high, while *B. parviflora* Poepp. & Endl. has been observed growing to 10 m, with some herbarium labels claiming heights of 12 m. Similarly, while these species all have erect stems, these range from frequently branching to unbranched, and free standing to trailing or supported by other vegetation. The stems of some species are thin and wiry (e.g., in *B.* sect. *Ruizopavonia*) while those in others are thick and succulent (e.g., in *B.* sect. *Hydristyles*) or tough to the point of appearing woody (*B.* sect. *Ruizopavonia*).

Most Peruvian *Begonia* species lack tubers or rhizomes, but all species in *Begonia* sects. *Australes*, *Eupetalum* and *Microtuberosa* and some species in *Begonia* sects. *Knesebeckia* and *Ignota* have either a tuber or a rhizome. We classify rhizomes as hardened, engorged stems with shortened internodes, rooting from one side and usually with persistent stipules. Rhizomes are either above-ground or belowground structures in contrast to tubers, which are always subterraneous. We classify tubers as relatively spherical structures that engorge rather than elongate over time, and with one or a few apical growing points.

While most tuberous or rhizomatous species are caulescent, several tuberous species and two rhizomatous species are acaulescent. In these species, both the stems and inflorescences grow directly from the apex or apices of the tuber or rhizome. With one exception (*Begonia erythrothrix* Tebbitt & Moonlight), this applies only to species with underground tubers or rhizomes. Occasionally, these species do have a short (< 1 cm) underground stem, but we class these species as acaulescent because it is not visible in the field and usually ambiguous at best on specimens. This character is most common in *Begonia* sect. *Eupetalum* but is also found in several species unassigned to section.

Two sections of Peruvian *Begonia* contain annual or at least short-lived perennial species: *B.* sect. *Doratometra* (Klotzsch) A.DC. and *B.* sect. *Ephemera* Moonlight. Both sections have two species and those in *B.* sect. *Doratometra* are the shortest lived, growing from seed to maturity in the space of a few weeks before seeding and dying. The two species in *B.* sect. *Ephemera* usually also die after a single growing season but have thicker stems at the base and may be able to survive the dry season. Species of both sections often form low, dense mats in particularly humid microclimates.

The final habit found in Peruvian begonias is the climbing species. Many erect species of *Begonia* rely upon other plants for support to a certain degree but climbing species do so by rooting at the nodes. Species in three Peruvian species have this characteristic: *B.* sects. *Gobenia* A.DC., *Rossmannia*

(Klotzsch) A.DC. and *Wageneria* (Klotzsch) A.DC. Species in *B.* sects. *Gobenia* and *Wageneria* generally germinate on the forest floor and remain as delicate herbs, climbing over the ground and rocks until they reach a suitable tree to climb. At this point, they climb rapidly and become much more robust, vigorous plants, often covering entire trees. All Peruvian species in these sections have been observed as growing to > 5 m in length but we suspect they grow much longer. In contrast, species in *B.* sect. *Rossmanniae* are smaller plants that rarely exceed 2 m. They often grow as epiphytes and root at the nodes more as anchorage than a climbing mechanism.

**Stipules**

All *Begonia* species possess paired stipules held either side of the petiole where it is inserted into the stem or, in acaulescent species, rhizome or tuber. Stipule characters are generally not of much use for identifying acaulescent species but can be key to identifying caulescent species. The key stipule characters for identification are their persistence, size, and margins. The shape of stipules is not particularly helpful in Peruvian taxa as almost all species have lanceolate to ovate stipules, while stipule colour tends to change as stipules age.

In this treatment we categorise stipules into one of four levels of persistence. These are: (i) early deciduous, applied to species where the stipules generally fall off before the leaf is mature; (ii) caducous, where the stipule is dropped once the leaf is mature but before it is old; (iii) late deciduous, where the stipules are dropped roughly as the leaves are dropped; (iv) persistent, where the stipule is retained longer than the leaf. There is a continuum from deciduous to persistent, but most species clearly fall within a single category. The level of stipule deciduousness varies considerably among species in the same section, which makes it a useful character for species-level identification.

The stipules of most caulescent *Begonia* species range from roughly 5–15 mm in length. Within this range, stipule size is not a particularly helpful character. However, when species have smaller (e.g., *B. heliantha* Tebbitt, *B. occultata* J.P.Allen & Moonlight sp. nov.) or larger (e.g., *B. obtecticaulis* Irmsch., *B. serratistipula* Moonlight sp. nov.) stipules, this is often among the most obvious differences between these species and their relatives. Similarly, the stipule margins of almost all Peruvian *Begonia* species are entire, so serrulate, serrate, or lacerate stipule margins are particularly useful characters for identification (e.g., in *B. humilis* Dryand. and *B. serratistipula* sp. nov.).

**Leaf shapes**

Leaf shapes in *Begonia* in general are extremely variable (Tebbitt 2005) and Peruvian *Begonia* includes a significant proportion of this variability. In common with most *Begonia* species, all Peruvian begonias have at least slightly asymmetrical leaves, though this is barely visible in some species and particularly species with peltate leaves. Leaf asymmetry is generally most pronounced at the leaf base where the petiole usually but not always joins the blade at a distinct angle. Peruvian *Begonia* also includes seven peltate leaved species. Of these, six are consistently peltate but two (*B. acerifolia* Kunth and *B. neoharlingii* L.B.Sm. & Wassh.) have both peltate and basifixed leaved populations. In most peltate species, the petiole insertion is roughly ⅓ of the way along the leaf lamina but *B. aeranthos* L.B.Sm. & B.G.Schub. is highly unusual in being minutely peltate. No Peruvian species of *Begonia* are consistently compound-leaved, but a single population of *B. parviflora* from Cusco Region has palmately-compound leaves.

The overall shape of the leaves of Peruvian *Begonia* differs from elliptic to spherical, while they are held at angles varying from straight to 90 degrees relatively to the petiole. In some cases, the rough leaf shape and angle is consistent across a section. For example, the leaves of *B.* sect. *Cyathocnemis* are generally transversely ovate while the leaves of *B.* sect. *Ruizopavonia* are more or less straight and elliptic. There is however enough variation in the leaf shape and angle within sections that these characters should

not be used in isolation. There is also significant variation in leaf size in Peruvian *Begonia*. The largest leaves of *B. elachista* Moonlight & Tebbitt are 3 × 2.5 cm and those of *B. foliosa* Kunth are 3.5 × 1.2 cm, while the leaves of only *B. parviflora* reach at least 50 × 50 cm and probably much more. While leaf size is rarely enough to identify a species, it can be extremely helpful in excluding potential species.

**Leaf margins and lobing**

Within Peruvian *Begonia*, leaf margins vary from entire to irregularly double-dentate (Fig. 1). Furthermore, within both species and individuals, leaf margins can vary from entire to serrate or dentate, even along the length of a single leaf, with many species having more complex margins towards the apices of their leaves. Despite this, many species have uniform leaf margins, so we are able to use them to distinguish species.

A further character that can be useful for identification to species is whether the leaf margin is aciliate or ciliate. In all Peruvian begonias, leaf marginal cilia are simple, and they are usually found at the tips of leaf teeth or occasionally also between leaf teeth. The presence of marginal cilia is highly variable within sections but usually consistent within species (with some notable exceptions). It may however be used to tell similar or closely related species apart. For example, *B. bracteosa* A.DC. and *B. cyathophora* Poepp. & Endl. are species that have been consistently confused since their first publication. There are several characters that can be used to distinguish them but the most reliable vegetative character is whether the leaf margins are ciliate.

In addition to their margins, the leaves of several Peruvian *Begonia* species have cusps or lobes. The difference between a cusp and a lobe is somewhat arbitrary, but we refer to cusps as small, usually < 1 cm long lobes at the tips of major veins (e.g., Fig. 32B). In contrast, lobes are at least 1 cm deep and are usually clearly differentiated (e.g., Fig. 2F). The number of lobes and cusps or lobes are often variable within a species, but their presence can be used to eliminate those species that always lack them.

**Leaf venation**

The venation of Peruvian *Begonia* is highly variable and extremely useful for identification. We define the following main venation types: (i) peltate, (ii) palmate, (iii) palmate-pinnate, (iv) 3-veined from the base, and (v) pinnate (Fig. 2). In general, the type of venation is an excellent character for identifying specimens to section. For example, all species in Peruvian *B.* sect. *Gobenia* have peltate venation while all species in Peruvian *B.* sect. *Casparya* have pinnate venation. In rare cases, the prominence of veins is also an excellent character. For example, in *B.* sect. *Ruizopavonia* the secondary veins are prominent from the lower leaf lamina while in *B.* sect. *Lepsia* they are held within the lamina. Within sections though, the number of secondary veins can be an excellent character to species. In *Begonia*, counting the number of secondary veins in all venation types can be subjective. The largest secondary veins are usually unambiguous, but some observers may count smaller veins while others may exclude them. We provide a range of values for numbers of secondary veins for all species.

We treat venation in Peruvian *Begonia* as pinnate where the leaf has one primary vein, and all secondary veins are clearly derived from that primary vein (Fig. 2A). In primary venation, there are no secondary veins directly at the petiole insertion. In most Peruvian begonias with pinnate venation, the secondary veins are clustered towards the base of the leaf so it can appear superficially like palmate-pinnate venation but there is always separation between the petiole insertion and first secondary vein.

Two Peruvian *Begonia* species are what we term 3-veined from the leaf base: *B. glabra* Aubl. and *B. rossmanniae* A.DC. These species have a clear primary vein with secondary veins on both sides of that vein, but they also have exactly one secondary vein at the petiole insertion on each side of the leaf lamina (Fig. 2B). Unlike species with palmate-pinnate venation, there are always exactly three veins from the base and the two lateral veins are of an equal size.

The most common venation pattern in Peruvian *Begonia* species is palmate-pinnate venation. This describes the situation in which a species has several secondary veins derived both from the petiole insertion and a primary vein (Fig. 2D). There is a continuum in character states from palmate-pinnate to palmate in *Begonia* (Fig. 2C–E), but each species only fills a small part of this continuum. We define palmately-veined species as those where there is no clear primary vein with its own secondary veins (Fig. 2E). To further break up this continuum and aid in species identification, we also recognise species as palmately veined but with one primary vein if there is a primary vein, but it is only marginally more distinct than the secondary veins (Fig. 2C).

Peltate venation is found in three sections in Peru and one species that is unassigned to section (*B. urubambensis* Tebbitt). In many respects, peltate venation is a specialised form of palmate venation where the leaf insertion is within the leaf lamina. In peltate venation, the number of secondary veins is

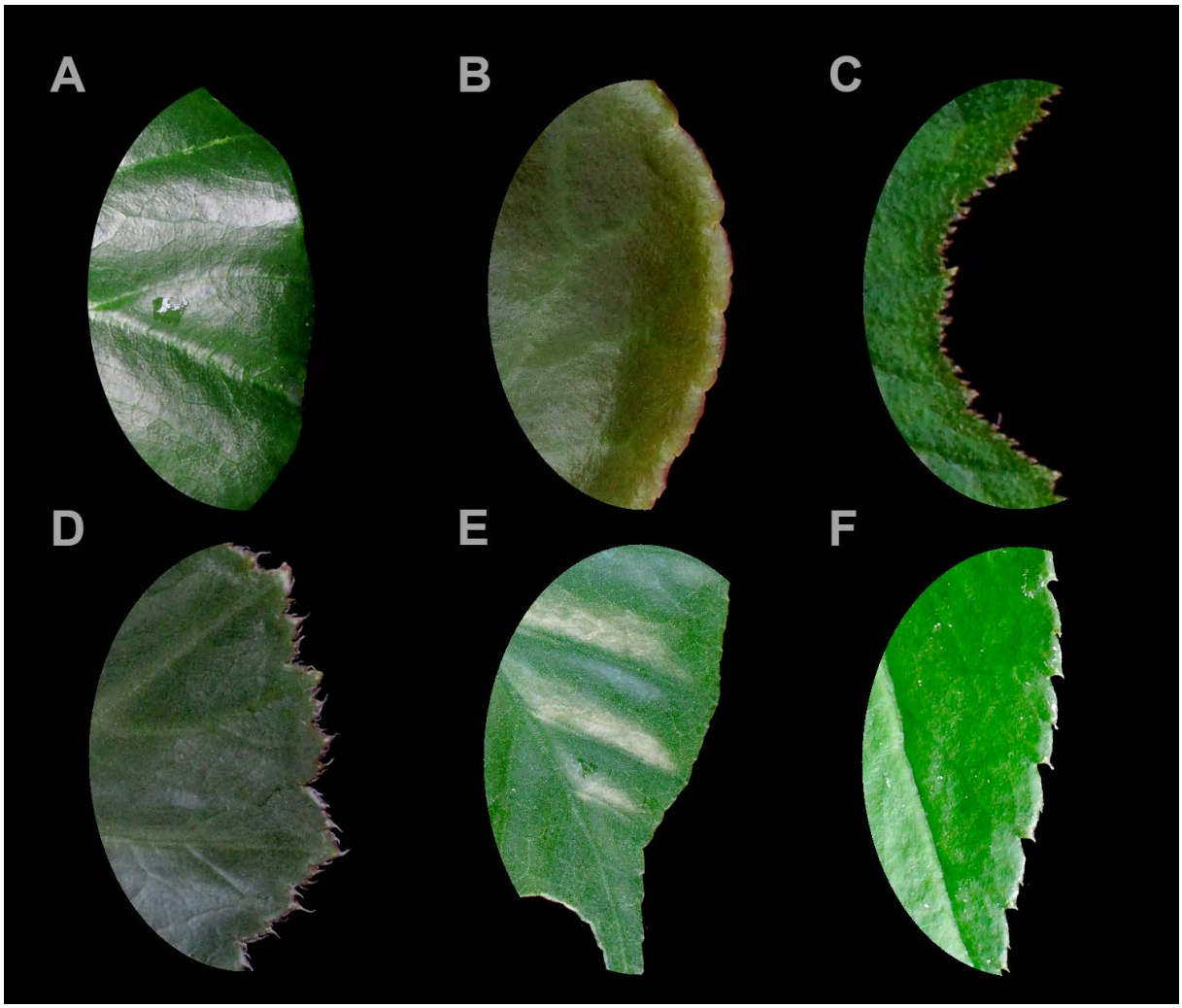


**Fig. 1.** Leaf margins of Peruvian *Begonia*. **A**. Entire, aciliate margins (*B. stenotepala* A.DC.). **B**. Crenate, aciliate margins (*B. joshii* Moonlight). **C**. Denticulate, ciliate margins (*B. acerifolia* Kunth). **D**. Irregularly double-dentate, ciliate margins (*B. obtecticaulis* Irmsch.). **E**. Serrulate, aciliate margins (*B. glauca* (Klotzsch) Ruiz & Pav. ex A.DC.). **F**. Serrate, ciliate margins (*B. foliosa* Kunth). Photographs taken by D.A. Purvis & P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh.

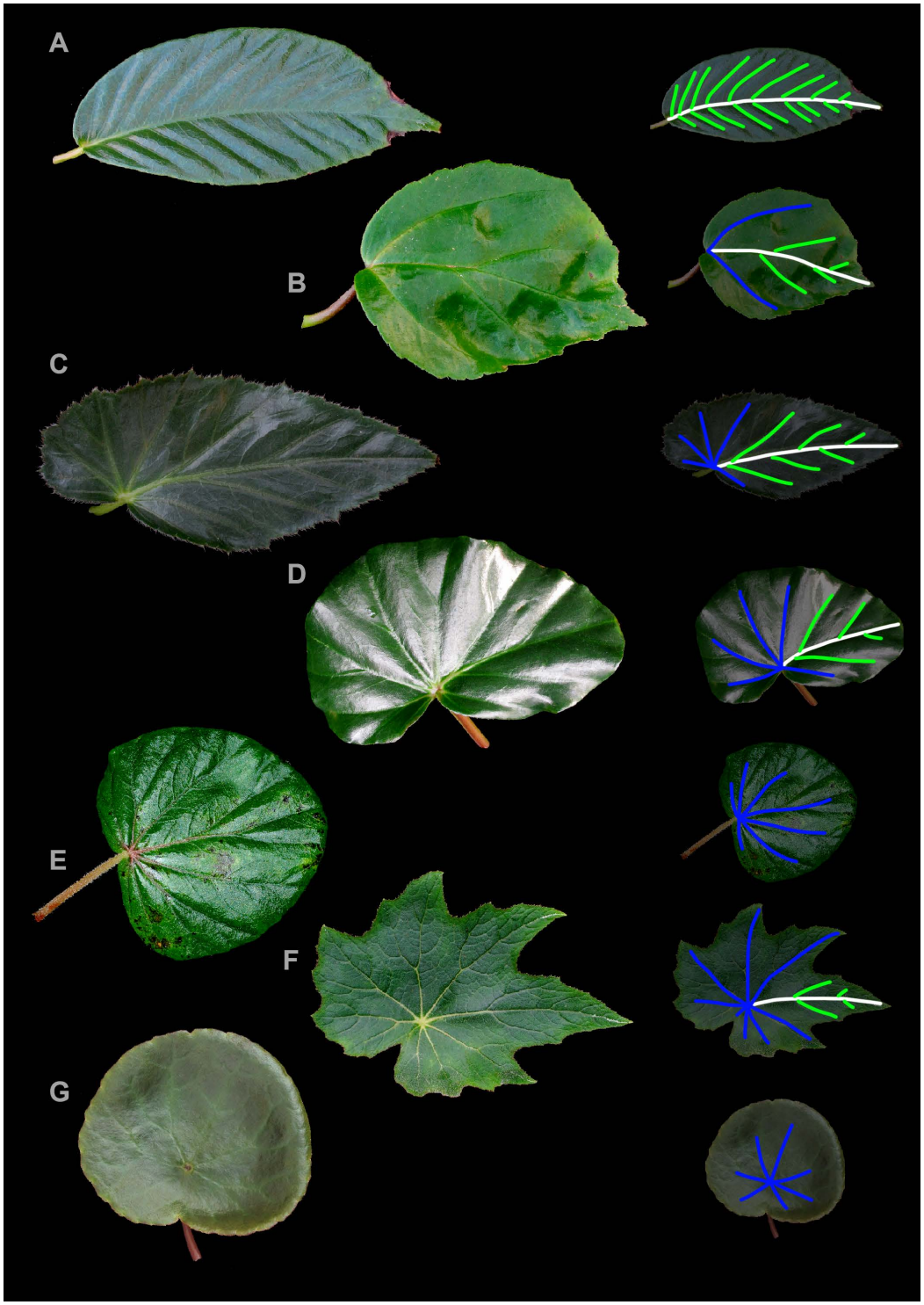


**Fig. 2.** Venation in Peruvian *Begonia*. **A**. Pinnate venation (*B. yaracuyensis* Moonlight). **B**. Pinnate venation, 3-veined from the base (*B. glabra* Aubl.). **C**. Palmate-pinnate venation (*B. obtecticaulis* Irmsch.). **D**. Palmate venation with one primary vein (*B. stenotepala* L.B.Sm. & B.G.Schub.). **E**. Palmate venation (*B. lamolina* Moonlight). **F**. Peltate venation with one primary vein (*B. acerifolia* Kunth.). **G**. Peltate venation (*B. joshii* Moonlight). Primary veins are shown in white, secondary veins from the petiole insertion in blue, and secondary veins from the primary veins in green. Photographs taken by D.A. Purvis & P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh.

counted as the number of large veins that reach the petiole insertion (Fig. 2G). Like palmately-veined species, it is often possible to recognise a primary vein with secondary veins from the side (Fig. 2F). In these cases, we also describe the venation as 'palmate but with one primary vein' and provide a range of possible secondary veins found on each side of the vein.

**Inflorescences**

The position of inflorescences is a very useful character for identification in Peruvian *Begonia*. In most species and sections, the inflorescence is axillary, arising in the axis of a leaf (Fig. 3A). This is the case for all acaulescent, tuberous or rhizomatous species, where the inflorescence arises directly from the tuber or rhizome in the apex of a leaf, and for most caulescent species. In two species and sections, the inflorescence is terminal, arising at the apex of the stem (Fig. 3C). These are *B. buddleiifolia* A.DC. and *B. rossmanniae* of *B.* sects. *Pilderia* and *Rossmannia*, respectively.

The inflorescences of Peruvian *Begonia* are mostly symmetrical dichasia (compound, dichasial cymes), which we refer to herein as cymose. The arrangement of the staminate and pistillate flowers across the cymes is usually the same, with staminate flowers held as the central flower between the lower branches, and the final cymes of each branch composed of a central, staminate flowers flanked by two pistillate flowers (Fig. 3A). In several species, this overall structure is reduced. This can either be to a monochasium (Fig. 3B) or to a dichasium with some monochasial sections. The third type of inflorescence is the thyrsoid inflorescence, which in Peru is unique to *B. buddleiifolia* and *B. rossmanniae*, which are also unique in having terminal inflorescences (Fig. 3C). The lateral branches of the inflorescences of these two species are generally compound dichasia and reduce in size to simple dichasia towards the apex of the inflorescence.

The inflorescences of almost all Peruvian species of *Begonia* are bisexual, bearing both staminate and pistillate flowers. Bisexual inflorescences are almost always protandrous, with the staminate flowers opening first, followed by the pistillate flowers. The only exceptions to bisexual inflorescences in Peru are the unisexual inflorescences of *Begonia* sect. *Gobenia*. In the Peruvian members of this section, an individual inflorescence only bears either staminate or pistillate flowers but a single plant bears both staminate and pistillate inflorescences.

Bracts are present in the inflorescences of all Peruvian begonias. In the vast majority of cases, bracts are paired and held either side of every node in an inflorescence on the same axis as the inflorescence branches (e.g., Fig. 3B). The two exceptions to this are in species with thyrsoid inflorescences, where the lateral branches of the main branch are subtended by a single inflorescence, and in *B. cyathophora*, where the first pair of bracts are fused into a continuous cup-shaped structure. We do not use bract characters to distinguish species or sections in this treatment, but they are described in full for each species.

**Staminate flowers**

The staminate flowers of Peruvian *Begonia* species are typical of the genus in that they are composed of undifferentiated tepals (rather than sepals and petals) and a varying number of stamens. Most Peruvian *Begonia* species have either a single, equal pair of tepals (Fig. 4A) or two pairs of tepals: an outer pair held perpendicular to a usually smaller, inner pair (Fig. 4B). There are three exceptions to this. Firstly, *B. buddleiifolia* can either have two, equal tepals or four tepals in two pairs, though we have only seen specimens with four tepals in Peru. Secondly, *B. elachista* can have two tepals; four tepals in two, equal pairs; or three tepals, including an equal pair and a smaller third tepal. Third, the members of the octopetala group of *B.* sect. *Eupetalum* can have up to eleven tepals (Fig. 4C), which are generally whorled but can be paired. In most cases, tepal number is consistent across sections.

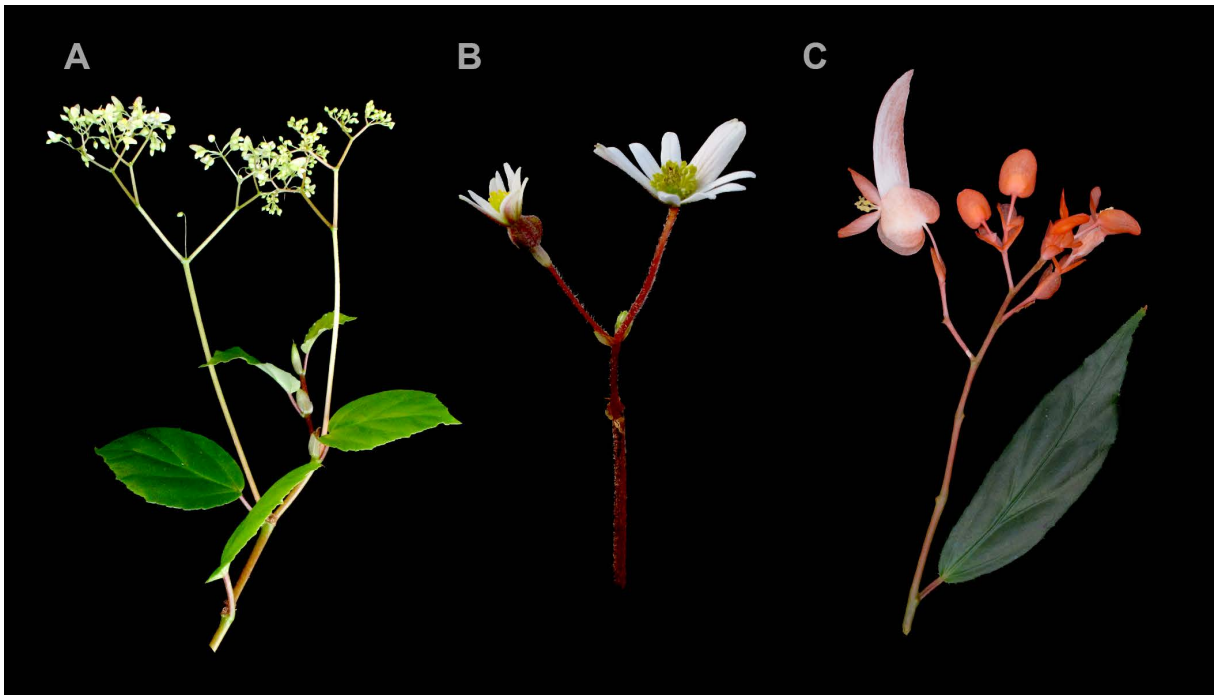


**Fig. 3.** Inflorescence structure in Peruvian *Begonia*. **A**. Axillary, dichasial cyme, with central, staminate flowers, *B. glabra* Aubl. **B**. An axillary (leaf axis not shown) monochasial cyme, *B. pleiopetala* A.DC. **C**. A terminal, thyrsoid inflorescence, composed of lateral dichasia reducing in size towards the apex of the inflorescence, *B. rossmanniae* A.DC. Photographs taken by D.A. Purvis & P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh.


**Fig. 4.** Staminate tepal number in Peruvian *Begonia*. **A**. A single, equal pair of tepals, *B. bracteosa* A.DC. **B**. An outer pair of tepals held perpendicular to a smaller, inner pair of tepals, *B. buddleiifolia* A.DC. **C**. Ten tepals in a member of the octopetala group of *B.* sect. *Eupetalum* (Lindl.) A.DC., *B. pleiopetala* A.DC. Photographs taken by D.A. Purvis in the living collections of the Royal Botanic Garden Edinburgh.

Irrespective of tepal number, the tepals of Peruvian *Begonia* can either be held spreading or projecting. We treat tepals as spreading if they are held more or less perpendicular to the axis of the flower (Fig. 5A–B) and projecting if the tip of the tepal is held at an angle of less than 45° degrees from the main axis of the flower (Fig. 5C–D). Across Peruvian *Begonia*, most species with projecting tepals on their staminate flowers also have vivid red or orange flowers (e.g., Fig. 5C), which suggests they may be hummingbird pollinated. This is not however always the case, as the staminate tepals of *B. foliosa* project but are white (Fig. 5D, at least in Peru). It can be difficult to determine whether a species has projecting or spreading tepals on herbarium specimens, so we concede we may have incorrectly scored this character for some of the species we have not seen in the field.

The tepals on the staminate flowers of most Peruvian *Begonia* species are ovate with rounded apices while the inner tepals (if present) are mostly elliptic. However, deviations from this are both frequent and extremely useful for identification. This is particularly true of species with either acuminate (e.g., *B. stenotepala*, *B. monadelpha* (Ruiz ex Klotzsch) A.DC.) or notched apices (*B. anemoniflora* Irmsch.) to their tepals.

The colour palette of the tepals of the world's *Begonia* is rather limited. Most species have white flowers, often with a tinge of pink, with the exception of a clade of yellow flowered species endemic to Africa (Moonlight *et al.* 2018). While most (65 out of 76) Peruvian begonias sometimes or always have white tepals on their staminate flowers, a relatively high proportion across most sections have coloured tepals. Fifteen species can have red or orange tepals, while two species, *B. heliantha* and *B. scorpiocaulis* Moonlight & Tebbitt, always have yellow tepals. In most species, tepal colour is consistent but a few widespread species have tepals that range in colour from white to red or orange (e.g., *B. rossmanniae*, *B. veitchii* Hook.f.). Tepal colour is not consistent within sections, so we only use it to help identify plants to species.

The number of stamens found in the staminate flowers of Peruvian begonias ranges from two (*B. elachista*) to 125 (*B. unilateralis* Rusby). The number of stamens is a reasonably helpful character for species level


**Fig. 5.** Staminate tepal projection in Peruvian *Begonia*. **A**–**B**. Spreading tepals. **C**–**D**. Projecting tepals. **A**. *B. glabra* Aubl. **B**. *B. bracteosa* A.DC. **C**. *B. stenotepala* L.B.Sm. & B.G.Schub. **D**. *B. foliosa* Kunth. Photographs taken by D.A. Purvis & P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh.

identifications but unfortunately the number of stamens is highly variable within species including at the extremes of stamen number. *Begonia elachista* has either two or four stamens while *B. unilateralis* has anything from 75 to 125. We tend therefore not to use stamen number to distinguish species except where the known numbers do not overlap at all, such as in several otherwise similar species of *B.* sect. *Cyathocnemis*. A further useful stamen characteristic is the insertion or fusion of the stamens. Most Peruvian begonias have filaments that are either free to the base or shortly fused only at the base but those of a few species are fused into a large and conspicuous column (e.g., *B. monadelpha*, *B. thyrsoidea* Irmsch.). This character is found in species in several sections.

**Pistillate flowers**

As with the staminate flowers, the tepals of the pistillate flowers of all *Begonia* species are composed of an undifferentiated whorl of tepals. The number of tepals on the pistillate flowers is usually stable with a few exceptions (e.g., *B. subspinulosa* Irmsch.). The most common number of tepals is five, with most other species having two tepals. While occasionally useful for identifying begonias to species, we try not to use this character too frequently as pistillate flowers are usually open for less time than the staminate flowers and the tepals are usually deciduous.

While not the case in all *Begonia* species, the tepals of the pistillate flowers of all Peruvian begonias are the same colour as the tepals of the staminate flowers. Equally, all Peruvian species with projecting tepals on the staminate flowers have projecting tepals on the pistillate flowers.

The shape of the tepals on the pistillate flowers of *Begonia* is usually less useful than the shape of the tepals on the staminate flowers. This is because the tepals are usually subequal and, in species with five tepals, grade from a relatively rounded largest tepal to a relatively elliptic smallest tepal. In species with two tepals, the tepals are usually both broadly ovate. There are therefore relatively few cases where tepal shape can be used to unambiguously distinguish species.

The number of styles in Peruvian *Begonia* ranges from two to four and is equal to the number of locules in the ovary (see below). The form of the styles is diverse and can be useful in both sectional or species level determination. Like most species of *Begonia* worldwide (Doorenbos *et al.* 1998), most Peruvian species have bifid styles with the stigmatic papillae held in a spirally twisted band (Fig. 6A–C). The styles of both *B.* sect. *Apteron* C.DC. and *B.* sect. *Gobenia* are unusual in being both fused at the base and reniform, with the stigmatic papillae spiralling around the reniform style apices (Fig. 6D). Finally, several species of Peruvian *Begonia* have irregularly multifid styles, with the stigmatic papillae held in spirally twisted bands around the style branches (Fig. 6E–F). This character has been used to separate sections; for example, in the section classification by Doorenbos *et al.* (1998), it was only found in members of *B.* sect. *Hydristyles* and *B.* sect. *Eupetalum* (Lindl.) A.DC. More recently, species in other sections have been described with irregularly multifid styles (e.g., Moonlight & Reynel 2018), or species with irregularly multifid styles have been shown to fall within other sections (Moonlight *et al.* 2018). This character state is no longer as useful for sectional level identification but remains extremely useful for distinguishing species. Within Peru, all species have either bifid or multifid styles, though this is not the case in Bolivia where single species can have both bifid and multifid styles (Moonlight & Fuentes 2022).

The ovaries of all Peruvian *Begonia* species are inferior and locule number ranges from two to four. The vast majority of species have three ovaries and wings and, except in a few rare cases, the number of locules (and styles, see above) is consistent within a species. The exceptions are *B. hitchcockii* Irmsch., which has four locules, and *B. elachista*, *B. speculum* Moonlight & Tebbitt, and *B. pleiopetala* A.DC., which have all been collected with two-locular ovaries. It is unclear how widespread two-locular ovaries

are across these species and it may be that this character state occurs only rarely in these species, and potentially other species, in relatively poor environments.

Most *Begonia* species have ovaries with wings, and the number of wings is equal to the number of locules (i.e., usually three). Ovary wings vary from subequal to unequal, whereby one wing is significantly larger than the other two. The wings of most species are either semi-circular or triangular, and in species with triangular wings the wing is widest at the top (apex) of the ovary. A few species also have rib-like wings, where the wing is reduced to a small ridge < 1 mm wide. The wings of *B.* sect. *Casparya* are modified into horn-like projections, which are discussed under fruits (see below).

The placentation of Peruvian *Begonia* species is relatively homogeneous compared to the diversity of placentation across the genus (Doorenbos *et al.* 1998). All Peruvian species have axillary placentation, and the placentae are either entire (Fig. 7A–D) or divided (Fig. 7E–H). We have dissected relatively few ovaries of Peruvian begonias, but in our experience, it is consistent across species except *B. hitchcockii*, which can have either entire or divided placentae. In all Peruvian species, the placentae bear ovules on both surfaces if entire and on all surfaces if divided.

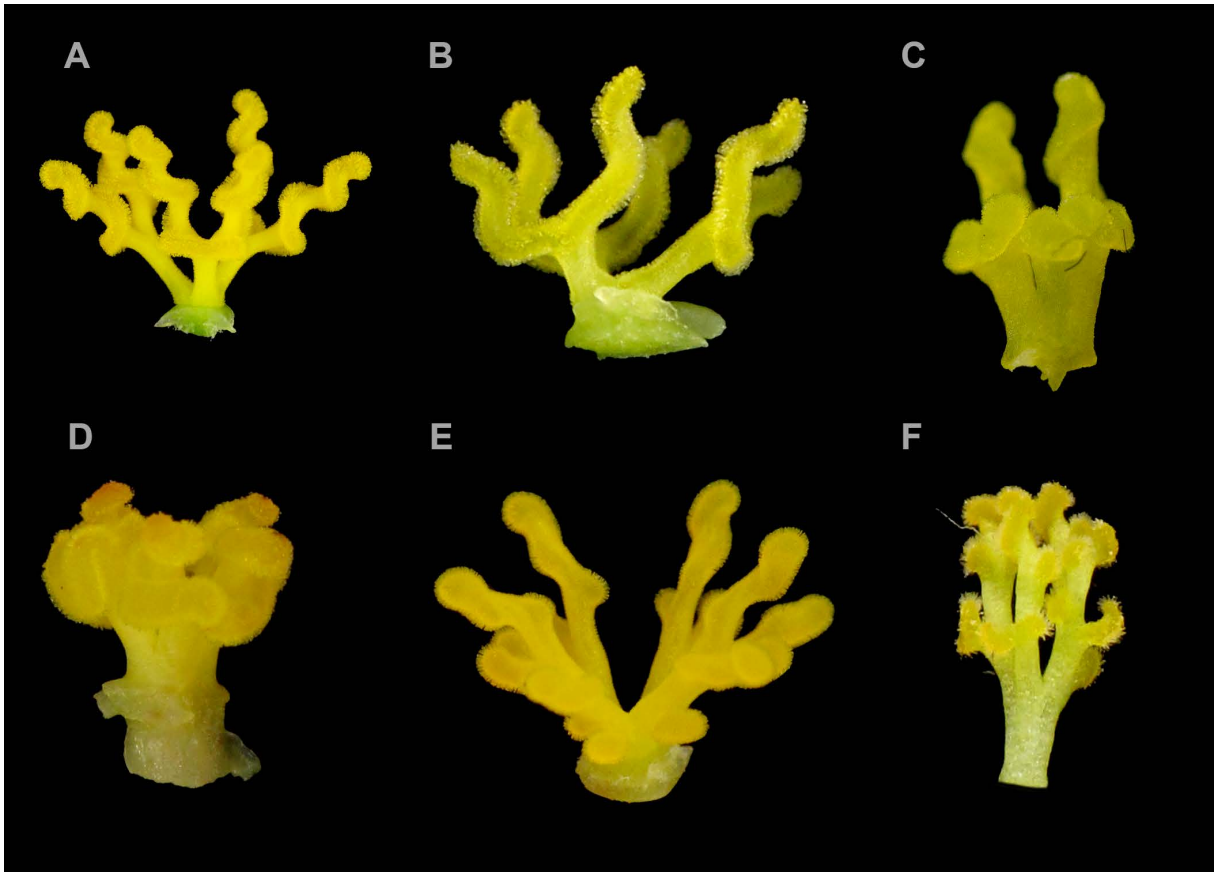


**Fig. 6.** Styles and stigmas in Peruvian *Begonia*. **A**–**C**. Bifid styles. **D**. Reniform styles. **E**–**F**. Irregularly multifid styles. **A**. Three styles and stigmas of *B. bracteosa* A.DC. **B**. Three styles and stigmas of *B. glabra* Aubl. **C**. Single style and stigma of *B. yuracyacuensis* Moonlight sp. nov. **D**. Three styles and stigmas of *B. pedemontana* Moonlight sp. nov. **E**. Three styles and stigmas of *B. obtecticaulis* Irmsch. **F**. Single styles and stigma of *B. pleiopetala* A.DC. Photographs taken by D.A. Purvis & P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh.

**Fruits**

The fruits of most Peruvian *Begonia* are typical of the genus and are dry capsules, dehiscing via slits that open along the edge of the locules. In common with the ovaries, the fruits usually also have wings, which tend to be the same shape as in the ovary (see above) and usually dry brown. While wings tend to stay the same shape in the fruit as in the ovary, they often increase greatly in size, particularly the largest wing in species with unequal wings. *Begonia* fruits tend to hold thousands of extremely small seeds and the wings act by shaking the capsule in the wind, slowly releasing those seeds (de Lange & Bouman 1999).

The most unusual fruits in Peruvian *Begonia* are those of *B.* sect. *Casparya*, which is found from Peru to Costa Rica (Hughes *et al.* 2015–ongoing). The fruits of this section open dorsally rather than laterally, and the wings are modified from wings into horn-like projections (Doorenbos *et al.* 1998; Jara-Muñoz *et al.* 2019). It is unclear how the unusual fruit morphology relates to seed dispersal, but it has been suggested that rain-wash or rain-ballistic may be the dispersal mechanism (Jara-Muñoz *et al.* 2019). This seems likely as the section is generally found only in the most humid of habitats, such as montane forests within the cloud layer or around waterfalls. We also note that we have observed the seeds of *B. urticae* L.f. germinating within the fruit in Peru. It is unclear whether this is common within the section or whether it has any evolutionary significance.

**Georeferencing**

We attempted to georeference all Peruvian *Begonia* specimens in the *Begonia* Resource Centre (Hughes *et al.* 2015–ongoing) that had a locality description but no original coordinates. Specimens were grouped

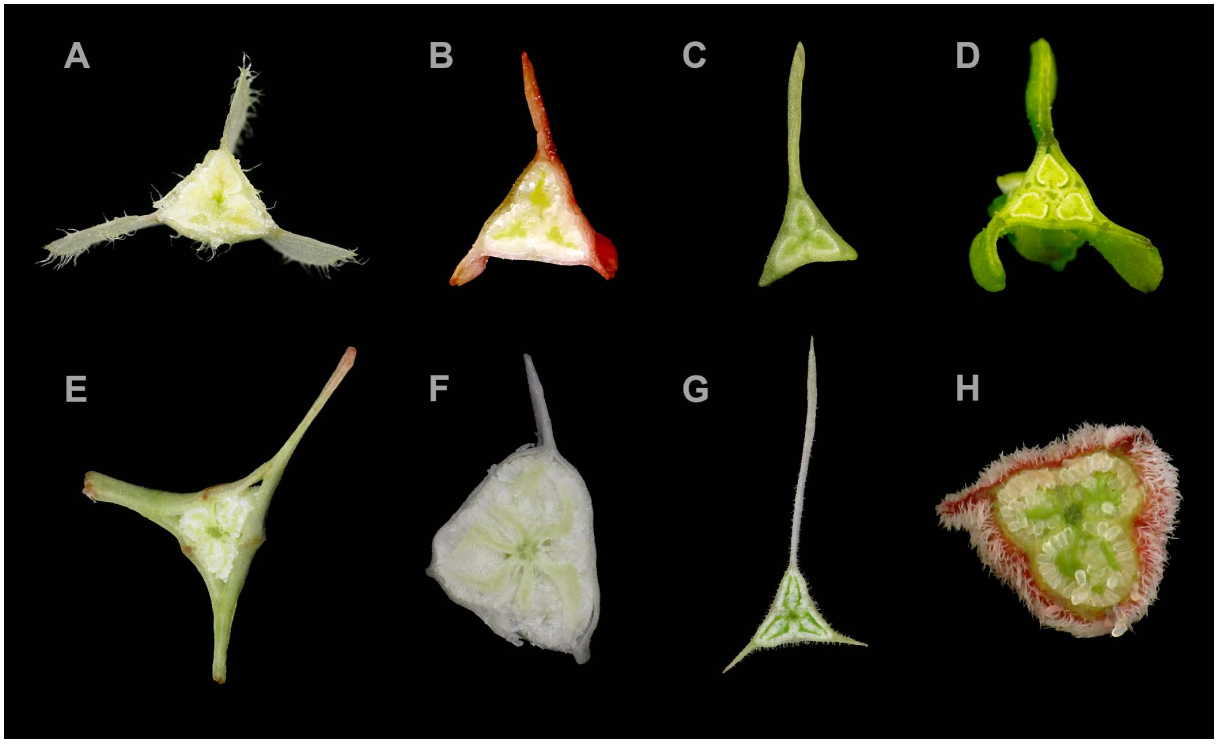


**Fig. 7.** Placentation in Peruvian *Begonia*. **A**–**D**. Axillary placentation with undivided branches. **E**–**H**. Axillary placentation with divided branches. **A**. *B. buddleiifolia* A.DC. **B**. *B. foliosa* Kunth. **C**. *B. glabra* Aubl. **D**. *B. joshii* Moonlight. **E**. *B. albomaculata* C.DC. **F**. *B. rossmanniae* A.DC. **G**. *B. bracteosa* A.DC. **H**. *B. pleiopetala* A.DC. Photographs taken by D.A. Purvis & P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh.

by region then province and where specimens had identical or very similar locality descriptions to specimens with coordinates, they were given the same coordinates. We searched for localities on Google Earth Pro ver. 7.3.4 and on maps available from the Peruvian ministry of transport and communications (Ministerio de Transportes y Comunicaciones 2016). Particular care was taken to ensure all localities were within any regions, provinces, or districts stated on specimen labels. Where localities included distances from named localities (e.g., "15 km south of Tarma"), we used the path tool in Google Earth Pro to estimate distances along major roads or rivers. Where available, we used the elevation on specimen labels to refine georeferences. Where we were unable to georeference specimen localities within roughly 5 km or 200 m of elevation with confidence, we did not georeference those specimens.

**Geographic distributions**

Peru is divided into 24 regions (also known as departments; Fig. 10A) and Callao and Lima Provinces, which include the city of Lima. For simplicity, we treat Callao and Lima Provinces as part of Lima Region because they are surrounded by Lima Region, and it is often impossible to determine whether older specimens are from these provinces or elsewhere in Lima Region, so our approach minimises the chance of misattributing a specimen. Species were assigned to regions based upon information on specimen labels. The geographic information on several specimens relates to old names for regions and in some cases the borders of regions have changed. The regions of georeferenced specimens were therefore confirmed through plotting them against a map of current regional boundaries in the *Begonia* Resource Centre (Hughes *et al.* 2015–ongoing).

**Vegetation types**

Peru is one of the world's megadiverse countries in part because it is highly topographically and ecologically diverse and contains all the world's biomes within its borders (Josse *et al.* 2011; Figs 8–9). The country is located in the west of South America from ca 5 km south of the equator to 18°21′ S and borders the Pacific Ocean at its western border, Ecuador and Colombia in the north, Brazil and Bolivia in the east, and Chile in the south. The key geographic feature in Peru is the Andes, which runs from north to south and reaches > 6500 m in elevation. The Andes act as a barrier, not just to travel and species, but also to moisture. The eastern lowlands and Andean slopes are extremely humid, whereas west of the Andes, many inter-Andean valleys, and much of the higher Andes in the south of the country are arid. The topographical complexity of the Andes has created a wealth of different habitats and ecological regions.

In this account we assign all *Begonia* species to one or more habitat types to aid in their identification. While we use the term habitat types for these units, they represent a compromise between delimiting ecological and biogeographic units and were chosen because they best represent the distribution of Peruvian begonias. For example, montane forests in the northwest of Peru are considered as a unit because they are geographically separate from ecologically similar montane forests on the eastern slopes of the Andes (Weigend *et al.* 2005) and have a distinct *Begonia* flora. Species were assigned to habitat types based upon, (i) our field knowledge of the species; (ii) habitat descriptions on specimen labels; (iii) mapping georeferenced specimens in Google earth; (iv) in the case of different subsections of montane forest, specimen elevation.

**Amazonian forest**

Two thirds of the land area of Peru lies east of the Andes and consists of lowland rainforest in the Amazonian basin, which we refer to here as Amazonian forest (Fig. 9A). In this study, we delimit the upper elevational limit of Amazonia as 800 m, above which we classify humid forest as montane forest. Most of the Amazonian Forest is relatively unsuitable for most species of begonias with a few exceptions, because begonias tend to prefer cooler and often sloping or rocky environments (Tebbitt 2005). *Begonia* sect. *Doratometra* includes two species of annual *Begonia*, which are found throughout

Amazonia in shaded, humid environments. The maynensis group of *B.* sect. *Knesebeckia* (Klotzsch) A.DC. and *B.* sect. *Pilderia* together include five species in Amazonia, which are primarily found growing on humid banks, including riverbanks. Finally, the Amazonian *Begonia* flora includes two species that are lianescent or epiphytic: *B. glabra* and *B. rossmanniae*.

The remainder of species found in Amazonian forests are mostly found around the margins of Amazonia in the transition to lower montane forest. This both includes species at their lower elevational limits but also species currently only known from Amazonia such as *B. herrerae* L.B.Sm. & B.G.Schub. and *B. wollnyi* Herzog. The transition from Amazonia to lower montane forest is relatively poorly collected and we suspect these species may be much more widespread than currently suspected and may also be found in lower montane forest.


**Fig. 8.** Peruvian vegetation types. **A**. Amazonian forest, Pasco Region. **B**. Northwest Peruvian montane forest, Piura Region. **C**. Dry forest, Piura Region. **D**. Lomas, Lima Region. All photographs taken by P.W. Moonlight.

**Montane forests**

The eastern slopes of the Andes of Peru support an almost-continuous band of montane forest from the upper limits of lowland rainforest to the tree line at around 800–3800 m (Fig. 8B–D). Across their elevational range, montane forests represent a gradient from lowland rainforest to upper montane forest. As elevation increases, trees tend to get shorter and more tortuous, the number of lianas decreases, and the number of terrestrial herbs and epiphytes increases (Young & León 1999). Most montane forests receive > 1500 mm of rainfall each year, but many montane forests receive at least this amount of water annually through wind- and cloud-driven precipitation (Cavelier 1996). The mean annual temperature of Andean montane forests ranges from ca 19°C at their lower limits to ca 7°C at the treeline (Young & León 1999). Begonias are found across the full elevational range of montane forests in Peru, but many species are restricted to a relatively small elevational band. We divide the montane forests on the eastern slopes of the Andes into three habitat types based upon their elevation: lower montane forests, from 800–1500 m a.s.l. (Fig. 8D); middle montane forests, from 1500–2500 m a.s.l. (Fig. 8C); and upper montane forests from 2500–3800 m a.s.l. (Fig. 8B).

The northern Andes of Ecuador and Colombia also have a continuous band of montane forests on their western flanks. These forests are maintained by humid air masses above the equatorial pacific current, which brings warm water to the Pacific coasts of Ecuador and Colombia. The coastal waters of Peru are dominated by the cold Humboldt current, which is responsible for the aridity of the Peruvian desert. At the boundary of these two currents from southern Ecuador into northern Peru, there is a transition from humid forests in the north to dry forests (see below) then desert (Weigend 2002). In this transition zone in northwest Peru, there are a few isolated patches of montane forest on the western slope of the Andes. Most are either on particularly prominent mountains or at the heads of valleys at around 2000–2800 m a.s.l., where the relatively little and often seasonal precipitation is funnelled into small areas. These montane forests are believed to be remnants of an older, more continuous band of montane forest so were named northwest Peruvian relict montane forests by Weigend *et al.* (2005). These forests are similar in elevation to the middle and upper elevation forest on the eastern flanks of the Andes and are similar in appearance but have a distinct flora and support many endemics (Weigend *et al.* 2005). We treat these as northwest Peruvian relict montane forests (Fig. 9B).

The *Begonia* flora of all Peruvian montane forests is highly diverse and includes species in several sections and of many life forms. Most species are semi-succulent, erect or scrambling perennials that flower in the dry season and are typically found in dense but small populations at the edge of montane forest patches, including next to streams or at roadsides. The same species tend to be found in much lower densities in the understories of intact montane forests, though this is the only known habitat for some such species. At lower elevations, many of the climbing or annual species found in Amazonian forests are also found while tuberous or caulescent, perennating species tend to be found at either higher elevation, on rock faces, or in relatively seasonal montane forests. There is a particularly high prevalence of perennating species in the northwest Peruvian montane forests, which reflects their seasonal nature. Most tuberous species only flower and fruit in the wet season when relatively little botanical collecting is carried out so remain underrepresented in herbaria. Finally, the most conspicuous *Begonia* in most montane forests is *B. parviflora*, which is a perennial species characteristic of naturally or artificially disturbed montane forests, including roadsides or landslides. It is the largest *Begonia* species in the world, reaching at least 12 m in height, and has large, conspicuous inflorescences that have been known to turn mountainsides white (personal observation).

**High elevation grasslands**

Above the tree line, much of Andean Peru supports a wet, montane grassland system known as the Central Andean Puna (Squeo *et al.* 2002; Oyague & Cooper 2020) and which we refer to as high elevation grasslands (Fig. 8A). The puna receives much of its rainfall through cloud-driven moisture but also

receives 1000–2000 mm of rainfall per year (Squeo *et al.* 2002) and extends upwards to the snowline. Due to its high elevation, the diurnal temperature range of high elevation grasslands are high and snow and night-time frosts are common (Squeo *et al.* 2002). Furthermore, there is often a distinct dry season in puna ecosystems and all high elevation grassland *Begonia* species are geophytic, surviving the dry season as a subterraneous tuber or rhizome. The only Peruvian begonias found in puna are members of either *B.* sects. *Australes* L.B.Sm. & B.G.Schub. or *Eupetalum*, with *B. veitchii*, *B. octopetala*, and *B. pleiopetala* being by far the most widespread and common.

**Lomas**

The majority of lowland Peru west of the Andes is extremely arid desert punctuated by a few semi-persistent rivers, which support narrow bands of semi-deciduous gallery forests. While this desert is


**Fig. 9.** Peruvian vegetation types. **A**. High elevation grasslands, Junín Region. **B**. Upper montane forest, Cajamarca Region. **C**. Middle montane forest, San Martín Region. **D**. Lower montane forest, Pasco Region. All photographs taken by P.W. Moonlight.

extremely dry and does not support any *Begonia* species, it is covered by a semi-permanent, low layer of cloud for much of the austral winter. There are several hills along the coast of Peru and a short distance inland that are around 200 to 800 m in elevation and exposed to this cloud layer (Dillon *et al.* 2011; Fig. 9D). These hills support a unique, seasonal habitat known as Lomas which is maintained almost exclusively from cloud-driven precipitation. The flora of the Lomas consists primarily of annuals and geophytic perennials but includes relatively few woody plants, and almost all species die back or survive the dry season as seeds (Dillon *et al.* 2011). The *Begonia* flora of the Lomas includes exclusively geophytic species of *B.* sect. *Eupetalum*, which survive the dry season as subterraneous rhizomes. Most begonias grow around the bases and in cracks in rocks, which likely provide their rootstocks further protection from the most extreme of the dry season's aridity and heat. There are Lomas the full length of the coast of Peru from La Libertad Region southwards and in northern Chile (Dillon *et al.* 2011). Begonias have been collected as far south as the Lomas de Quilmaná in Lima Region. This distribution matches the northern Peruvian Lomas group, and it is suggested that until recently these were separated from those further south (Manrique *et al.* 2014).

Dillon *et al.* (2011) characterised Lomas species into four main types: (i) pantropical or weedy species; (ii) desert species; (iii) species disjunct from the Andean Cordillera; and (iv) Lomas endemics. All *Begonia* Lomas species fall comfortably into the third category and are perhaps relatively recent colonisers from the Andes. *Begonia tumbezensis* Irmsch. is most common in dry forests in Loja Province (Ecuador) and neighbouring Tumbes Region. *Begonia octopetala* L'Hér. is found in a diverse range of Andean habitats, including northwest Peruvian relict montane forest, high elevation grasslands, and upper montane forest. *Begonia geraniifolia* Hook. is most common in Lomas formations, but it is also found in northwest Peruvian relict montane forests and Andean scrubland.

**Dry forest and scrublands**

Dry forests are defined as closed canopy forests found on fertile soils in tropical areas that receive < 1800 mm of rainfall, but with a distinct dry season (DRYFLOR 2016). In Peru, there are four main dry forest areas (Linares-Palomino 2006), but begonias are only present in two: the dry forests of the north-western coast and north-western foothills of the Andes, and the inter-Andean valleys surrounding the Marañón, Mantaro, and Apurimac valleys. While the western slopes of the Andes in northern Peru are principally dry forest, in central Peru they are replaced by scrubland known in Peru as Matorrales. In terms of their *Begonia* flora, the Matorrales are very similar to dry forests and we include them in the same category.

Most dry forest and scrubland begonias are tuberous members of *Begonia* sect. *Eupetalum* or *Knesebeckia* and survive the dry season as a tuber or rhizome. In a few cases, however, begonias are found in humid microhabitats within dry forests, for example on river-banks or surrounding waterfalls, and retain their above-ground growth all year. The only deciduous dry forest species in Peru is *B. fischeri* Shrank, which is a short-lived species found in wet, ephemeral areas such as ditches and flooded fields.

**Semi deciduous forests**

While there are no begonias present in the dry forests found in several valleys in eastern Peru (see above), two species are present in the semi-deciduous forests surrounding these forests. *Begonia ulmifolia* Willd. has only been collected in semi-deciduous forest in the Huallaga valley and *B. urubambensis* in similar forests in the Chanchamayo and Urubamba valleys. Unlike the species found in the dry forests, these species are not geophytic. Rather, they both have succulent, aerial stems and have the ability to drop their leaves if required.

### Conservation assessments

Provisional global conservation assessments were carried out for all Peruvian *Begonia* species, using all georeferenced specimen data for Peruvian species held in the Begonia Resource Centre (Hughes *et al.* 2015–ongoing), including records outside of Peru. A particular effort was made to confirm the identity of non-Peruvian specimens, and to georeference non-Peruvian specimens of poorly-collected Peruvian species (e.g., *B. parcifolia* C.DC. or *B. ludwigii* Irmsch.). The Extent of Occurrence (EOO) and Area of Occupancy (AOO) were calculated for all species using tools within the *Begonia* Resource Centre (Hughes *et al.* 2015–ongoing). AOO calculations were made using a 2 × 2 km grid. Georeferenced specimen data were uploaded into Google Earth Pro to determine whether they were collected within protected areas, and we used historical imagery within Google Earth Pro to look for evidence of deforestation near to collection sites. For species we have collected, we also used our own field knowledge to assess whether they were in decline or how liable to disturbance they were. All assessments were made following IUCN Red List Criteria (IUCN 2019).

## Results

We recognise 76 species of *Begonia* in Peru, which are divided into 18 sections and include six species not yet assigned to a section (Table 1). We also recognise two subspecies of *B. octopetala* and three varieties: two of *B. veitchii* and one of *B. pastoensis*. The most diverse section of *Begonia* in Peru is *Cyathocnemis* (17 species) followed by *Knesebeckia* (13 species), though this section is polyphyletic and contains representatives of at least three clades in Peru (Moonlight *et al.* 2018; Fig. 10B). Six sections are represented in Peru by single species, of which three are monotypic (*B.* sects. *Donaldia*, *Microtuberosa* Moonlight & Tebbitt, and *Rossmannia*). Thirty-seven species of *Begonia* (49% of the

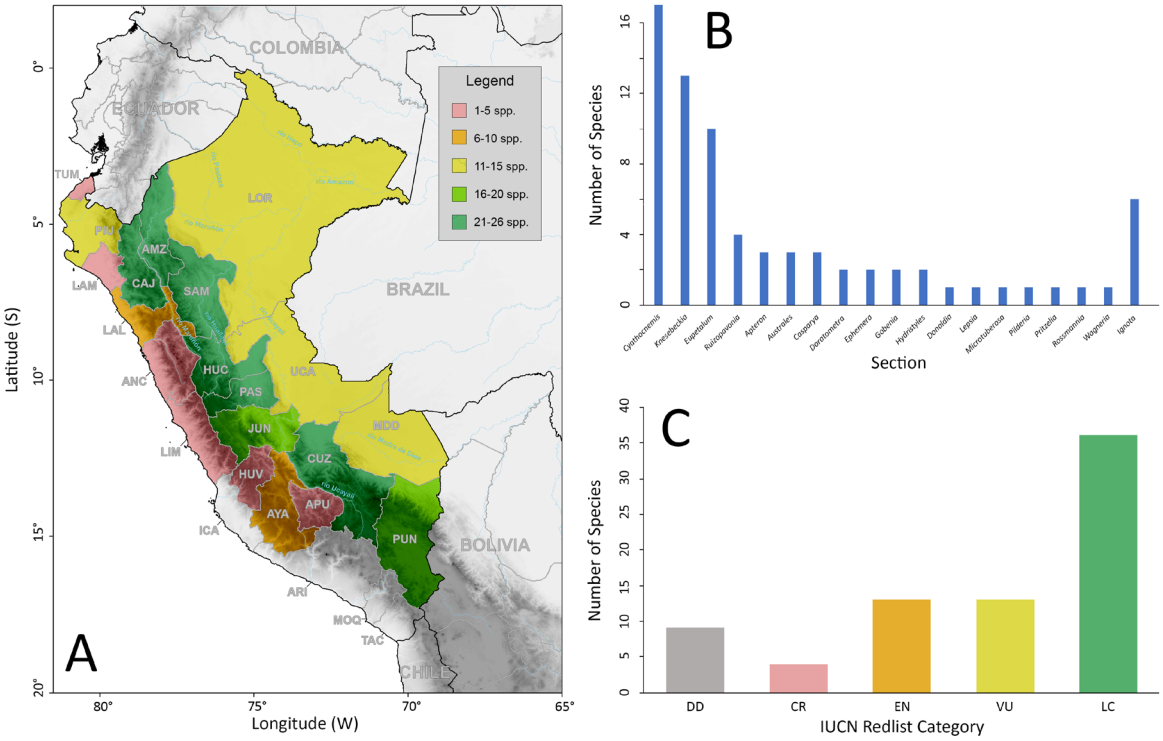


**Fig. 10.** The number of species of Peruvian *Begonia*. **A**. Found in each Peruvian regions. **B**. In each section of *Begonia* following Moonlight *et al.* (2018). **C**. Provisionally assessed under each IUCN red list category.

**Table 1** (continued on next page). Alphabetical list of Peruvian *Begonia* species detailing their botanical sections sensu Moonlight *et al.* (2018) and their index within this paper.

| Species | Section | Index |
|---|---|---|
| *Begonia acerifolia* | *Knesebeckia* | 49 |
| *Begonia aeranthos* | *Gobenia* | 41 |
| *Begonia albomaculata* | *Knesebeckia* | 56 |
| *Begonia alto-peruviana* | *Cyathocnemis* | 19 |
| *Begonia amoeboides* | *Cyathocnemis* | 9 |
| *Begonia andina* | *Hydristyles* | 43 |
| *Begonia anemoniflora* | *Eupetalum* | 35 |
| *Begonia arrogans* | *Knesebeckia* | 50 |
| *Begonia bifurcata* | Unplaced | 71 |
| *Begonia bracteosa* | *Cyathocnemis* | 10 |
| *Begonia brandbygeana* | *Knesebeckia* | 45 |
| *Begonia brevicordata* | *Cyathocnemis* | 20 |
| *Begonia buddleiifolia* | *Pilderia* | 63 |
| *Begonia chemillenensis* | *Knesebeckia* | 57 |
| *Begonia condorensis* | *Casparya* | 6 |
| *Begonia cyathophora* | *Cyathocnemis* | 11 |
| *Begonia deltoides* | *Cyathocnemis* | 21 |
| *Begonia elachista* | *Microtuberosa* | 62 |
| *Begonia erythrothrix* | Unplaced | 72 |
| *Begonia fischeri* | *Eupetalum* | 29 |
| *Begonia foliosa* | *Lepsia* | 60 |
| *Begonia geraniifolia* | *Eupetalum* | 31 |
| *Begonia glabra* | *Wageneria* | 70 |
| *Begonia glauca* | *Ruizopavonia* | 66 |
| *Begonia guaduensis* | *Lepsia* | 61 |
| *Begonia heliantha* | *Australes* | 3 |
| *Begonia herrerae* | *Australes* | 4 |
| *Begonia hirta* | *Casparya* | 7 |
| *Begonia hirtella* | *Eupetalum* | 30 |
| *Begonia hitchcockii* | *Gobenia* | 42 |
| *Begonia huancabambae* | *Knesebeckia* | 51 |
| *Begonia humilis* | *Doratomatra* | 27 |
| *Begonia imbrexiformis* | *Cyathocnemis* | 12 |
| *Begonia joshii* | *Eupetalum* | 32 |
| *Begonia lamolina* | *Cyathocnemis* | 13 |
| *Begonia longinqua* | *Cyathocnemis* | 15 |
| *Begonia longitepala* | *Cyathocnemis* | 22 |
| *Begonia lophoptera* | *Cyathocnemis* | 14 |

**Table 1** (continued).

| Species | Section | Index |
|---|---|---|
| *Begonia lucifuga* | *Cyathocnemis* | 23 |
| *Begonia ludwigii* | *Knesebeckia* | 52 |
| *Begonia maynensis* | *Knesebeckia* | 58 |
| *Begonia monadelpha* | *Knesebeckia* | 53 |
| *Begonia neoharlingii* | *Eupetalum* | 33 |
| *Begonia nunezii* | *Ruizopavonia* | 67 |
| *Begonia obtecticaulis* | *Cyathocnemis* | 16 |
| *Begonia occultata* | Unplaced | 73 |
| *Begonia octopetala* | *Eupetalum* | 36 |
| *Begonia parcifolia* | *Knesebeckia* | 46 |
| *Begonia parviflora* | *Pritzelia* | 64 |
| *Begonia pastoensis* | *Apteron* | 1 |
| *Begonia pedemontana* | *Apteron* | 2 |
| *Begonia peruviana* | *Ruizopavonia* | 68 |
| *Begonia piurensis* | *Knesebeckia* | 47 |
| *Begonia pleopetala* | *Eupetalum* | 37 |
| *Begonia polypetala* | *Eupetalum* | 38 |
| *Begonia pseudopleiopetala* | *Eupetalum* | 39 |
| *Begonia rossmanniae* | *Rossmannia* | 65 |
| *Begonia scorpiocaulis* | *Knesebeckia* | 59 |
| *Begonia semiovata* | *Doratomatra* | 28 |
| *Begonia serotina* | *Knesebeckia* | 54 |
| *Begonia serratistipula* | *Cyathocnemis* | 17 |
| *Begonia speculum* | Unplaced | 74 |
| *Begonia stenotepala* | *Cyathocnemis* | 24 |
| *Begonia subspinulosa* | *Cyathocnemis* | 25 |
| *Begonia thyrsoidea* | Unplaced | 75 |
| *Begonia tumbezeisns* | *Eupetalum* | 40 |
| *Begonia ulmifolia* | *Donaldia* | 26 |
| *Begonia unilateralis* | *Hydristyles* | 44 |
| *Begonia urticae* | *Casparya* | 8 |
| *Begonia urubambensis* | Unplaced | 76 |
| *Begonia vargasii* | *Cyathocnemis* | 18 |
| *Begonia veitchii* | *Australes* | 5 |
| *Begonia velata* | *Knesebeckia* | 48 |
| *Begonia weberbaueri* | *Eupetalum* | 34 |
| *Begonia wollnyi* | *Knesebeckia* | 55 |
| *Begonia yuracyacuensis* | *Ruizopavonia* | 69 |

flora) are recognised as Peruvian endemics. We recognise twelve newly described species, provide seven new records for the country, and publish 25 synonyms including fourteen previously accepted species. We provide a full nomenclatural account of the synonyms of all Peruvian species, including synonyms never recognised from Peru, and provide eighty-three newly designated lectotypes, four neotypes, and four epitypes.

Provisional global IUCN Red List assessments are provided for all Peruvian begonias. We assess 37 species (49%) as Least Concern, 14 species (18%) as Vulnerable, 14 species (18%) as Endangered, and 3 species (4%) as Critically Endangered under IUCN criteria (Fig. 10C). A total of 31 Peruvian *Begonia* species (41%) are considered threatened. We were unable to produce IUCN assessments for eight species (11%), which we class data deficient. It is however worth noting that the eight data deficient species are almost certainly rare or range restricted so should most likely fall within a threatened category. If all data deficient species were classified within a threatened category, that would place most Peruvian *Begonia* species in threatened categories (53%).

We provide a map of the number of *Begonia* species known from each Peruvian region (Fig. 10A). The region with the most known *Begonia* species is Cusco (26 species), followed by Huánuco (24 species), San Martín (23 species), then Amazonas and Pasco Regions (22 species). There are no records for *Begonia* in four Peruvian regions: Arequipa, Ica, Moquegua, and Tacna. The largest number of species tend to be shared by adjacent regions on the eastern slopes of the Andes; for example, Amazonas and San Martín, San Martín and Huánuco, and San Martín and Pasco Regions each share 15 species.

We also plot the number of species (Fig. 11A) and collections (Fig. 11B) from 0.25-degree grid cells across Peru. Our results highlight that *Begonia* collections remain sparse across much of the country, with notable exceptions around Divisoria (Huánuco Region), Oxapampa (Pasco Region), and Cuzco (Cusco Region). The best collected areas tend to correspond with areas with high numbers of species, but many poorly collected areas on the eastern slopes of the Andes also have relatively high numbers

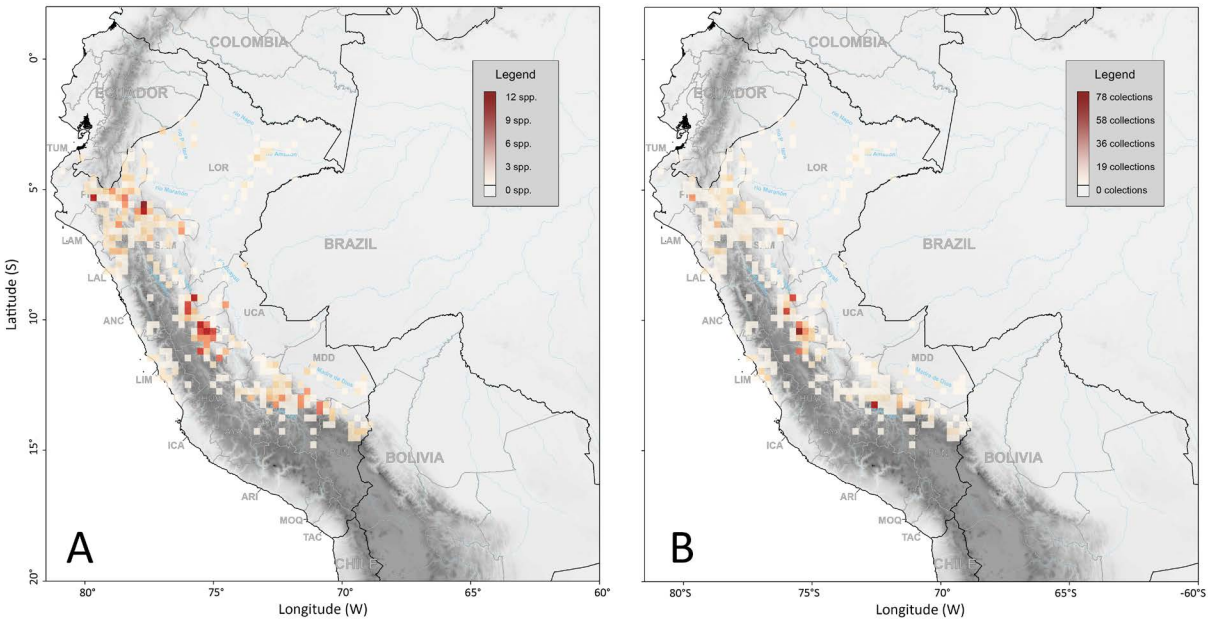


**Fig. 11.** The number of species (**A**) and collections (**B**) of *Begonia* found within 0.25-degree grid cells across Peru, which equates to approximately 27.5 × 27.5 km.

of collected species. We also highlight northwest Peru as a relatively poorly collected area with a high number of collected species.

We assign all Peruvian *Begonia* species to one or more of nine broad habitat types. Most species (89%) were found in three or fewer habitat types, but two species were found in more than four: *B. parviflora* (five habitat types) and *B. octopetala* (six habitat types). The habitat types with the richest *Begonia* floras were lower montane forests (38 species), middle montane forests (35 species), and Amazonian forest (23 species; Fig. 12). A total of 37 species were endemic to individual habitat types with lower montane forests having the largest endemic *Begonia* flora (nine species) followed by northwest Peruvian

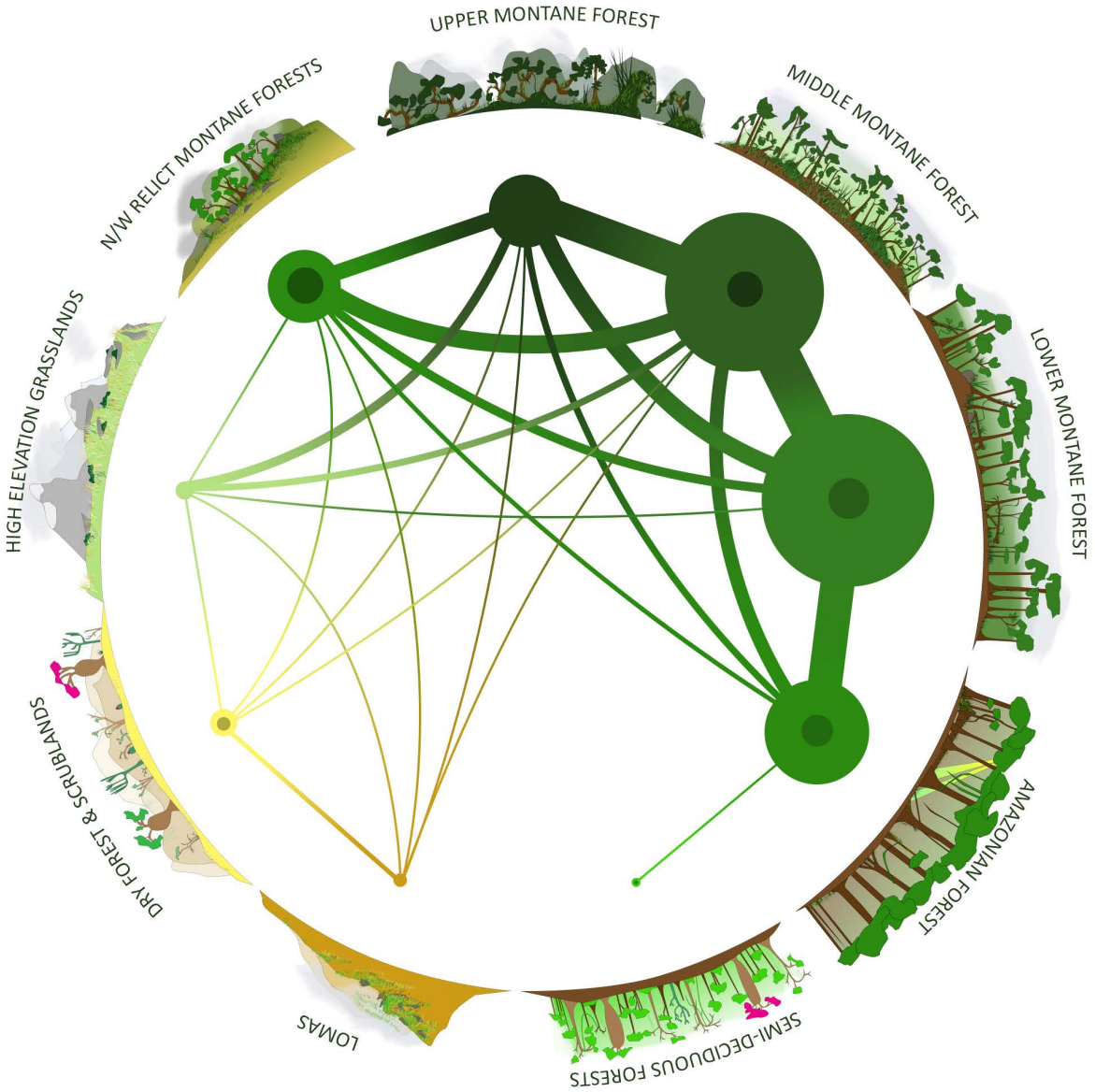


**Fig. 12.** The number of species of Peruvian *Begonia* (size of circles) and species endemic to habitat types (size of darker circles) found within each of nine habitat types within Peru. The width of lines between circles indicates the number of shared species between habitat types.

relict montane forests (eight species). We also evaluated the number of species shared between different habitat types (Fig. 12). The most species were shared among the four types of montane forest, and between lower montane forest and Amazonian forest. We also demonstrate relatively high numbers of shared species between high elevation grasslands and upper (four species) or middle montane forest (three species), and Lomas and dry forest and shrublands (2 species).

## *Taxonomic treatment*

Class Equisetopsida C.Agardh (Agardh *et al.* 1825)
Subclass Magnoliidae Novák ex Takht. (Takhtajan 1967)
Superorder Rosanae Takht. (Takhtajan 1967)
Order Cucurbitales Juss. ex Bercht. & J.Presl (von Berchtold & Presl 1820)
Family Begoniaceae C.Agardh (Agardh 1824)

Genus ***Begonia*** L.

### Description

Caulescent or acaulescent herbs, with or without a tuber or rhizome. *Stems* erect, trailing, or climbing, sometimes rooting at the nodes. *Stipules* paired, either side of the petiole, persistent to deciduous. *Leaves* alternate, basifixed or peltate; blade simple or rarely palmately-compound, subsymmetric to asymmetric, margin entire to serrate, lobed or lacking lobes, veins peltate, palmate, palmate-pinnate, or pinnate. *Inflorescences* bisexual or rarely unisexual, axillary or terminal, cymose, monochasial, or thyrsoid, protandrous. *Staminate flowers*: tepals 2–11; stamens 2–125, filaments free or fused into a column, anthers dehiscing via lateral slits or pores, connectives extended or not extended, symmetrically basifixed or filaments symmetrically fixed to the back of the anthers. *Pistillate flowers*: bracteoles lacking to 3, positioned directly beneath the ovary or on the pedicel; tepals 2–11, deciduous or persistent in fruit; ovary inferior, body unequally 2- to 4-winged, lacking wings, or 3-horned, dehiscing laterally or dorsally, placentation axillary, placentae branches entire or divided; styles 2–4, free or fused, once- to many times-divided, stigmatic papillae in one or several spirally-twisted bands per style. *Fruit* a capsule, wings or horns same shape and size as in ovary or expanding.

### Artificial key to Peruvian *Begonia*

1. Leaf lamina peltate ..... 2
– Leaf lamina basifixed..... 9

2 Plants tuberous or rhizomatous, terrestrial herbs; internodes short or lacking, if present not rooting at the nodes ..... 3
– Plants lacking a tuber or rhizome, climbing herbs; stem with elongate internodes and rooting at the nodes ..... 8

3 Plants rhizomatous..... 4
– Plants tuberous..... 7

4 Leaf laminae moderately to densely pubescent ..... 5
– Leaf laminae glabrous..... 6

5 Leaf laminae with 1 or more large triangular lobes, margins entire; tepals deciduous in fruit .....
..... ***B. acerifolia*** Kunth **49**
– Leaf laminae lacking lobes, margins serrulate; tepals persistent in fruit..... ***B. parcifolia*** A.DC. **46**

6 Plant lacking an aerial stem; tepals deciduous in fruit ..... ***B. urubambensis*** Tebbitt **76**
– Plant with an aerial stem; tepals persistent in fruit ..... ***B. serotina*** A.DC. **54**

7 Plant with an aerial stem; leaf margin serrate to dentate, rarely crenate; ovary and fruit wing apices acute ..... ***B. neoharlingii*** L.B.Sm. & Wassh. **33**
– Plant lacking an aerial stem; leaf margin crenate; ovary and fruit wing apices rounded to truncate ..... ***B. joshii*** Moonlight **32**

8 Petiole insertion < ¼ of the way up the lamina; tepals red ..... ***B. aeranthos*** L.B.Sm. & B.G.Schub. **41**
– Petiole insertion > ¼ of the way up the lamina; tepals white to yellow or green ..... ***B. hitchcockii*** Irmsch. **42**

9 Plants with a tuber or rhizome ..... 10
– Plants lacking a tuber or rhizome ..... 32

10 Plants with an above ground stem ..... 11
– Plants lacking an above ground stem ..... 21

11 Plant > 50 cm tall; internodes > 5 cm long ..... 12
– Plant < 50 cm tall; internodes < 5 cm long ..... 13

12 Leaf margins lacking cusps; staminate flowers 12–16 mm across; tepals of the staminate flowers with rounded apices; pistillate flowers ebracteolate ..... ***B. piurensis*** L.B.Sm. & B.G.Schub. **47**
– Leaf margins with 2–5 cusps along the largest side; staminate flowers 44–90 mm across; tepals of the staminate flowers with acuminate apices; pistillate flowers bracteolate ..... ***B. velata*** L.B.Sm. & B.G.Schub. **48**

13 Tuber < 5 mm in diameter; leaf blades < 3 × 3 cm in diameter; stamens 2 or 4 ..... ***B. elachista*** Moonlight & Tebbitt **62**
– Tuber > 1 cm in diameter; leaf blades > 3 × 3 cm in diameter; stamens > 5 ..... 14

14 > 50 stamens; leaf apices rounded to indistinct ..... ***B. veitchii*** Hook.f. **5**
– < 40 stamens; leaf apices acute to acuminate, rarely rounded to indistinct ..... 15

15 Stems glabrous to sparsely tomentose, the hairs < 1 mm long ..... 16
– Stems sparsely to densely villous or hispid, the hairs > 2 mm long ..... 19

16 Leaf venation palmate-pinnate; stems thin, wiry ..... 17
– Leaf venation palmate; stems succulent ..... 18

17 Stipule margins entire, aciliate; leaf upper and lower surfaces glabrous; stamens held on a 0.5 mm long column ..... ***B. speculum*** Moonlight & Tebbitt **74**
– Stipule margins lacerate, ciliate; leaf upper and lower surfaces sparsely to densely pilose; stamens held on a 2–2.75 mm long column ..... ***B. thyrsoidea*** Irmsch. **75**

18 Stipules persistent; leaf margin serrate; pistillate tepals 8–10 mm long ... ***B. geraniifolia*** Hook. **31**
– Stipules deciduous; leaf margin crenate to dentate; pistillate tepals 10–30 mm long ..... ***B. neoharlingii*** L.B.Sm. & Wassh. **33**

19 Tepals yellow, orange, or red; tepals glabrous on both surfaces ..... 20
– Tepals white to pink; tepals glandular pilose on the outer surface, glabrous on the inner surface .... ***B. bifurcata*** L.B.Sm. & B.G.Schub. **71**

20 Tepals yellow; stipules persistent, 1–3.5 mm long ..... ***B. heliantha*** Tebbitt **3**
– Tepals orange to red; stipules late deciduous, 5–7 mm long . ***B. herrerae*** L.B.Sm. & B.G.Schub. **4**

21 Staminate flowers with four tepals ..... 22
– Staminate flowers with five or more tepals ..... 28

22 Leaf margins unlobed or rarely with < 5 triangular lobes ..... 23
– Leaf margins with > 5 irregularly-shaped lobes ..... ***B. weberbaueri*** Irmsch. **34**

23 Plants with an above-ground creeping rhizome; petioles densely hispid, the hairs red ..... ***B. erythrothrix*** Tebbitt & Moonlight **72**
– Plants with an underground tuber or rhizome; petiole glabrous to densely villous, the hairs white . ..... 24

24 Outer tepals of the staminate flowers serrate; styles multifid ..... ***B. tumbezensis*** Irmsch. **40**
– Outer tepals of the staminate flower entire; styles bifid ..... 25

25 Ovaries sub-equally 3-winged; pistillate tepals persistent in fruit ..... ***B. parcifolia*** C.DC. **46**
– Ovaries unequally 3-winged; pistillate tepals deciduous in fruit ..... 26

26 Stipules > 8.5 mm long; stamens > 50; outer tepals of the staminate flowers > 12 mm long ..... ***B. veitchii*** Hook.f. **5**
– Stipules < 8.5 mm long; stamens < 30; outer tepals of the staminate flower < 12 mm long ..... 27

27 Leaf blade sub-symmetrical, orbicular; upper leaf surface concolourous mid-green; stamens ca 25; tepals deciduous in fruit ..... ***B. joshii*** Moonlight **32**
– Leaf blade asymmetrical, transversely ovate; upper leaf surface dark green, flushed light green and flecked silver around the veins; stamens 11–16; tepals persistent in fruit ..... ***B. occultata*** J.P.Allen & Moonlight sp. nov. **73**

28 Tepals vivid red; tepal apices acute ..... ***B. polypetala*** A.DC. **38**
– Tepals white to pink; tepal apices obtuse, rounded, truncate, or emarginate ..... 29

29 Tepals apices emarginate; leaf lower surface villous to densely villous ..... ***B. anemoniflora*** Irmsch. **35**
– Tepals apices variously obtuse, rounded, or truncate, never emarginate; leaf lower surface glabrous to variously pubescent, rarely villous on the veins ..... 30

30 Stamens 15–50 ..... ***B. pleiopetala*** A.DC. **37**
– Stamens 50–100 ..... 31

31 Pistillate tepals 6–10; leaf lower surface glabrous to sparsely lanate; leaf laminae to 25 × 27 cm ..... ***B. octopetala*** L'Hér. **36**
– Pistillate tepals 5; leaf lower surface glabrous, pubescent on the veins; leaf laminae to 15 × 11 cm ..... ***B. pseudopleiopetala*** Tebbitt **39**

32 Leaf laminae conspicuously lobed to > ⅓ of their width or palmately compound ..... 33
– Leaf laminae lacking lobes or lobed to < ⅓ of their width ..... 39

33 Plant semi-scandent to scandent, lacking a rhizome or a swollen stem base; tepals bright red; stamens united into a column ..... ***B. monadelpha*** (Klotzsch) A.DC. **53**
– Plant erect, often with a rhizome or swollen stem base; tepals white to pink; stamens free ..... 34

34 Plant > 3 m tall; leaves reaching > 40 cm wide; inflorescence branching > 10 times, > 50 cm wide ..... ***B. parviflora*** Poepp. & Endl. **64**
– Plant < 2 m tall; leaves < 30 cm wide; inflorescence branching < 10 times, < 50 cm wide..... 35

35 Leaf lamina circular in outline; petiole apex with a ring of trichomes..... 36
– Leaf lamina ovate in outline; petiole apex lacking a ring of trichomes..... 37

36 Stem with conspicuous petiole scars; leaf lobes sinuate, narrowly-triangular ..... ***B. ludwigii*** Irmsch. **52**
– Stem lacking petiole scars; leaf lobes straight, broadly-triangular..... ***B. huancabambae*** Moonlight sp. nov. **51**

37 Leaf lobed up to one-third of the length of the lamina; leaf margins crenate; staminate flower with < 40 stamens ..... ***B. arrogans*** Irmsch. **50**
– Leaf lobed around half the length of the lamina; leaf margins serrulate to serrate; staminate flowers with > 40 stamens ..... 38

38 Ovary and fruit with one long wing and two rib-like wings..... ***B. acerifolia*** Kunth **49**
– Ovary and fruit with 3 subequal wings..... ***B. wollnyi*** Herzog **55**

39 Plants climbing, rooting at the nodes..... 40
– Plants erect or with a strong prostrate stem but not climbing, rooting only at the lower nodes.... 41

40 Leaf blades more than twice as long as broad, lanceolate; stipules deciduous; inflorescences terminal, with < 10 flowers; tepals bright orange or red (rarely white outside of Peru); pistillate flowers and fruits with two paired, heart shaped bracteoles obscuring the ovary ..... ***B. rossmanniae*** A.DC. **65**
– Leaf blades less than twice as long as broad; stipules persistent; inflorescences axillary, with > 25 flowers; tepals white; pistillate flowers lacking bracteoles..... ***B. glabra*** Aubl. **70**

41 Leaves clustered towards the apex of the stem..... 42
– Leaves evenly spaced along the stem ..... 47

42 Upper leaf lamina smooth, glabrous to sparsely pilose, not glandular; inflorescence apical, cymose ..... 43
– Upper leaf lamina bullate, densely glandular-pilose; inflorescence terminal, thyrsoid..... ***B. buddleiifolia*** A.DC. **63**

43 Veins pinnate, sometimes 3 veined from the lase (Fig. 2A–B) ..... 44
– Veins palmate-pinnate, always > 3 veined from the base (Fig. 2C–E)..... 45

44 Stipules without an apical hair; inflorescences and both leaf surfaces glabrous ..... ***B. maynensis*** A.DC. **58**
– Stipules terminating in a 2–4 mm long apical hair; inflorescences and both leaf surfaces sparsely pilose to pilose ..... ***B. brandbygeana*** L.B.Sm. & Wassh. **45**

45 Leaf lamina 10–12.5 cm long; inflorescence bracts serrate; bracteoles ovate with serrate margins; tepals yellow ..... ***B. scorpiocaulis*** Moonlight & Tebbitt **59**
– Leaf lamina (12–)15–30 cm long; inflorescence bracts entire; bracteoles lanceolate with entire margins; tepals white to pink ..... 46

46 Petioles 8–22 cm long; staminate flowers with ca 40 stamens; upper edge of largest fruit wing ascending ..... ***B. albomaculata*** C.DC. **56**
– Petioles 3.5–10 cm long; staminate flowers with ca 20 stamens; upper edge of largest fruit wing perpendicular to the ovary ..... ***B. chemillenensis*** Moonlight **57**

47 Leaf veins pinnate ..... 48
– Leaf veins palmate or palmate pinnate ..... 58

48 Stipules large and persistent, longer than the internodes ... ***B. imbrexiformis*** Moonlight sp. nov. **12**
– Stipules deciduous or persistent, never longer than the internodes ..... 49

49 Fruits 3-horned with an elongated apical column; tepals white, pink, orange, or red ..... 50
– Fruits with three wings, lacking an apical column; tepals white or pink ..... 52

50 Stipules late deciduous; tepals of the pistillate flower < 6 mm long; outer two tepals of the staminate flower < 8 mm long ..... ***B. urticae*** L.f. **8**
– Stipules deciduous; tepals of the pistillate flower > 8 mm long; outer two tepals of the staminate flower > 8 mm long ..... 51

51 Tepals red; stamens 4–6; outer tepals of the staminate flower < 15 mm long .....
..... ***B. condorensis*** Jara & Moonlight sp. nov. **6**
– Tepals orange; stamens 12–18; outer tepals of the staminate flower > 20 mm long .....
..... ***B. hirta*** (Klotzsch) L.B.Sm. & B.G.Schub. **7**

52 Plant an annual, 30 cm tall or less ..... ***B. semiovata*** Liebm. **28**
– Plant a perennial, at least 30 cm tall ..... 53

53 Secondary leaf veins indistinct; staminate flower with 4 tepals ..... 54
– Secondary leaf veins prominent; staminate flower 2 tepals ..... 55

54 Leaf laminae to 3.5 × 1.2 cm, with 1–4 secondary veins on both sides of the laminae; stamens 30–50; styles bifid ..... ***B. foliosa*** Kunth **60**
– Leaf laminae to 10 × 4.5 cm, with 5–7 secondary veins on both sides of the laminae; stamens 15–25; styles multifid ..... ***B. guaduensis*** Kunth **61**

55 Stems densely tomentose ..... ***B. ulmifolia*** Willd. **26**
– Stems glabrous ..... 56

56 Leaf held at an angle of 45–90° relative to the petiole; stipules 10–35 mm long; styles irregularly multifid ..... ***B. glauca*** (Klotzsch) Ruiz & Pav. **66**
– Leaf lamina continuing in the same direction as the petiole; stipules 4–14 mm long; styles bifid ...
..... 57

57 Inflorescence branching 6–8 times; staminate tepals 2–2.5 mm long; bracts and bracteoles elliptic to ovate.....***B. peruviana*** A.DC. **68**
– Inflorescence branching up to 4 times; staminate tepals 10–14 mm long; bracts and bracteoles broadly-ovate .....***B. yuracyacuensis*** Moonlight sp. nov. **69**

58 Pistillate flowers with 2 tepals ..... 59
– Pistillate flowers with 3 to 5 tepals ..... 65

59 Staminate flowers with > 20 stamens ..... 60
– Staminate flowers with 6–12 stamens..... 64

60 Petioles glabrous, rarely-glandular pilose..... 61
– Petioles sparsely to densely pilose, never glandular-pilose..... 63

61 Stipules persistent; first pair of bracts equal in size to subsequent bracts, < 10 mm long.....
.....***B. subspinulosa*** Irmsch. **25**
– Stipules deciduous; first pair of bracts, larger than subsequent bracts, > 20 mm long..... 62

62 Leaf margins ciliate; stipules twice as long as broad; first two inflorescence bracts not fused.....
.....***B. bracteosa*** A.DC. **10**
– Leaf margins aciliate; stipules at least two thirds as broad as long; first two inflorescence bracts fused to form a cyathium ..... ***B. cyathophora*** Poepp. & Endl. **11**

63 Stipules deciduous, lanceolate; largest fruit and ovary wing entire at the apex; tepals glabrous.....
.....***B. lamolina*** Moonlight **13**
– Stipules persistent, reniform to ovate; largest fruit and ovary wing notched at the apex; tepals pilose on the outer surface.....***B. lophoptera*** Rolfe **14**

64 Stipule margins entire; leaf margins entire to serrulate ..... ***B. longinqua*** Moonlight sp. nov. **15**
– Stipule margin lacerate at the base, entire at the apex; leaf margins irregularly double dentate.....
..... ***B. serratistipula*** Moonlight sp. nov. **17**

65 Leaf laminae deltoid ..... 66
– Leaf laminae variously elliptic, lanceolate, oblanceolate, ovate, obovate, oblong-ovate, broadly-ovate, or reniform but never deltoid ..... 67

66 Tepals white to pink; fruit wings ascending ..... ***B. fischeri*** Schrank **29**
– Tepals brown or orange; fruit wings not ascending.....***B. deltoides*** Moonlight sp. nov. **21**

67 Stem rooting at the lower nodes ..... 68
– Stem not rooting at the lower nodes ..... 69

68 Internodes with a dense, long-villous indumentum; upper leaf lamina dark green flushed black; staminate flowers 20–40 mm across; fruit and ovary wings lacking or semi-circular .....
..... ***B. pastoensis*** A.DC. **1**
– Internodes tomentose; upper leaf lamina uniformly pale green; staminate flowers 8–18 mm across; fruit and ovary wings oblong to triangular ..... ***B. pedemontana*** Moonlight sp. nov. **2**

69 Stem and petioles with an indumentum of stellate hairs or peltate scales..... 70
– Stem and petioles glabrous or with an indumentum of simple hairs..... 71

70 Stem and petioles with an indumentum of stellate hairs ..... ***B. andina*** Rusby **43**
– Stem and petioles glabrous or with simple hairs ..... ***B. unilateralis*** Rusby **44**

71 Staminate flowers with 4 tepals ..... 72
– Staminate flowers with 2 tepals ..... 74

72 Leaves with 4–6 veins from the base; margin crenate ..... ***B. arrogans*** Irmsch. **50**
– Leaves with 6–8 veins from the base; margin serrate or dentate ..... 73

73 Leaf margins acuspidate; staminate flowers 1.2–1.6 cm across; tepals of the staminate flowers with rounded apices; pistillate flowers ebracteolate ..... ***B. piurensis*** L.B.Sm. & B.G.Schub. **47**
– Leaf margins with 2–5 cusps along the largest side; staminate flowers 4.4–9 cm across; tepals of the staminate flowers with acuminate apices; pistillate flowers bracteolate ..... ***B. velata*** L.B.Sm. & B.G.Schub. **48**

74 Stipule margins ciliate, at least at the base ..... 75
– Stipule margins aciliate throughout ..... 78

75 Stipule margin lacerate at the base, entire at the apex; pistillate tepals 2 or 3 ..... ***B. serratistipula*** Moonlight sp. nov. **17**
– Stipule margins entire; pistillate tepals 5 ..... 76

76 Lower leaf surface sparsely villous; leaf veins palmate ..... ***B. hirtella*** Link **30**
– Lower leaf surface glabrous; leaf veins palmate-pinnate ..... 77

77 Stem glabrous; inflorescence with up to 8 flowers; staminate flowers with 8–10 stamens ..... ***B. humilis*** Dryand. **27**
– Stem densely hispid; inflorescence with up to 48 flowers; staminate flowers with ca 25 stamens ..... ***B. nunezii*** Moonlight sp. nov. **67**

78 Tepal apices acuminate or long-acuminate; tepals bright red or orange ..... 79
– Tepal apices truncate, rounded, obtuse, or acute; tepals white, pink, brown, or orange ..... 80

79 Stipules late-deciduous to persistent, 12–35 mm long; leaves lanceolate to ovate ..... ***B. stenotepala*** L.B.Sm. & B.G.Schub. **24**
– Stipules deciduous, 8–12.4 mm long; leaves elliptic to oblanceolate ..... ***B. longitepala*** Moonlight sp. nov. **22**

80 Styles irregularly multifid ..... 81
– Styles bifid ..... 83

81 Stipules deciduous; leaf laminae reniform, apices indistinct; leaf venation palmate; stamens > 60. ..... ***B. amoeboides*** Moonlight **9**
– Stipules persistent; Leaf laminae lanceolate to ovate, apices distinct; leaf venation palmate-pinnate; stamens < 30 ..... 82

82 Stipules symmetrical, base cuneate; leaf margins irregularly double dentate ..... ***B. obtecticaulis*** Irmsch. **16**
– Stipules asymmetrical, auriculate on the broad side, cuneate on the narrow side; leaf margins serrulate ..... ***B. vargasii*** Moonlight sp. nov. **18**

83 Leaf laminae broadly-ovate; bracteole margins entire, aciliate; largest fruit wing contorted, angled 90° downwards ..... ***B. brevicordata*** L.B.Sm. & B.G.Schub. **20**
– Leaf laminae lanceolate to ovate; bracteole margins serrulate to serrate, ciliate; largest fruit wing not contorted ..... 84

84 Leaf laminae lanceolate, apices acuminate..... ***B. lucifuga*** Irmsch. **23**
– Leaf laminae ovate, apices obtuse to acute..... 85

85 Stipules persistent, ovate; leaf margins serrate..... ***B. subspinulosa*** Irmsch. **25**
– Stipules deciduous, elliptic; leaf margins serrulate ..... ***B. alto-peruviana*** A.DC. **19**

***Begonia*** sect. ***Apteron*** C.DC.

*Bulletin de l'Herbier Boissier II* 8 (5): 326 (de Candolle 1908). – **Type**: holotype: *Begonia exalata* C.DC.

**Notes**

*Begonia exalata* is the type species of *B.* sect. *Apteron*, which was described by Casimir de Candolle (de Candolle 1908). The section was synonymised with *B.* sect. *Knesebeckia* by Doorenbos *et al.* (1998) because it was separated by only one character: its fruit lacking wings. An ongoing revision of this section (Moonlight in prep.) demonstrates that *B. exalata* is allied to three other species: *B. microcarpa* A.DC., *B. pastoensis*, and *B. pedemontana* sp. nov. These species are phylogenetically distinct from the rest of *B.* sect. *Knesebeckia* (Moonlight *et al.* 2018) and can be distinguished as caulescent herbs that lack a tuber or rhizome and root at the lower nodes. We reinstate *B.* sect. *Apteron* to include these four species, including two found in Peru.

1. ***Begonia pastoensis*** var. ***pastoensis*** A.DC.
Figs 13A, 14

*Annales des Sciences Naturelles Botanique, Série 4* 11: 121 (de Candolle 1859). – **Type**: COLOMBIA • [Nariño Dept.] "Meneses", Pasto; [1°19′ N, 77°13′ W]; 1851–1857; *J.J. Triana 3031*; lectotype: K [K000536693], designated by Smith & Schubert (1946b: 87); isolectotypes: BM [BM001191445], BR [BR0000006957018], G, G-DC, P [P05587374].
de Candolle (1864: 285); Smith & Schubert (1946b: 86); Smith (1973: 217); Smith & Wasshausen (1979: 243, 1986: 35).

**Etymology**

The type specimen of *B. pastoensis* was collected by J.J. Triana near the city of Pasto in southern Colombia, and the species was named after this locality.

**Material examined**

PERU – **San Martín Region: Prov. Rioja** • Bosque de Protección Alto Mayo, unnamed trail from Centro de Interpretación Venceremos (km 382.5) to 381 on highway 5N; 5°39′57″ S, 77°44′54″ W; 1700–1800 m a.s.l.; 5 Jun. 2010; *J.L. Clark 11848*; US [US01862880], USM • Path through chacra from km 182 of road from Pedro-Ruiz to Rioja; 5°40′01″ S, 77°45′13″ W; 1743 m a.s.l.; 4 Jul. 2018; *P.W. Moonlight 1265*; E, USM • Bosque de Protección Alto Mayo, Trocha Kovachii; 5°42′11″ S, 77°45′15″ W; 1805 m a.s.l.; 2 Feb. 2016; *P.W. Moonlight & A. Daza 156*; MOL, E.

**Description**

Caulescent herb, to 80 cm high. *Stem* semi-scandent to erect, rooting at the lower nodes, rarely branching; internodes to 6.5 cm long, to 6 mm thick, succulent, pale green, densely villous. *Stipules* persistent, broadly-lanceolate, 5–10 × 7–10 mm, apex acute, mucronate, opaque, pale green, glabrous on the inside, hirsute on the outside, margin entire, aciliate. *Leaves* > 5 per stem, alternate, basifixed; petiole 3–10 cm long, pale green, densely-villous; blade asymmetric, ovate, to 15 × 10 cm, succulent, apex attenuate, base cordate, basal lobes slightly overlapping to overlapping, sinus to 18 mm deep, margin denticulate, sometimes with a cusp on the largest side of the lamina, ciliate, upper surface mid-green, sparsely to densely pilose, lower surface pale green flushed purple, densely-villous on the veins, glabrous to sparsely villous between the veins, veins palmate, 6–8 veined from the base. *Inflorescences* 1 per stem, bisexual, axillary, erect, cymose, branching up to 4 times, bearing up to 4 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 14 cm long, pale pink, densely villous, bracts persistent, ovate, 12–18 × 12–18 mm, opaque, white to pale green, tinged red, glabrous, apex rounded to obtuse, margin entire, ciliate. *Staminate flowers*: pedicels to 35 mm long, villous; tepals 4, spreading, outer 2 ovate, 10–19 × 8–18 mm, apex rounded, pink, glabrous, margin serrulate, ciliate, inner 2 lanceolate to broadly-ovate, 10–15 × 6–8 mm, apex rounded, pink, glabrous, margin entire, aciliate; stamens ca 25, spreading, yellow, filaments ca 1 mm long, free, anthers ovoid, ca 0.5 × 0.3 mm long, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 30 mm long; bracteoles 2, positioned directly beneath the ovary, ovate, ca 10 × 10 mm, apex rounded, opaque, colour unknown, glabrous, margin entire, aciliate; tepals 5, subequal, persistent in fruit, spreading, elliptic to lanceolate, 8–14 × 4–6 mm, apex obtuse, pink, glabrous, margin entire, aciliate; ovary body broadly-ovoid, 6–8 × 7–10 mm, colour unknown, glabrous to sparsely villous, wings lacking to subequally 3-winged, wings semi-circular 7–9 × 1–3 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, fused at the base, 3–4 mm long, reniform, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 30 mm long. *Fruit body* broadly-ovoid, to 10 × 10 mm, drying brown, wings lacking or expanding to subequal, semi-circular wings to 9 × 9 mm.

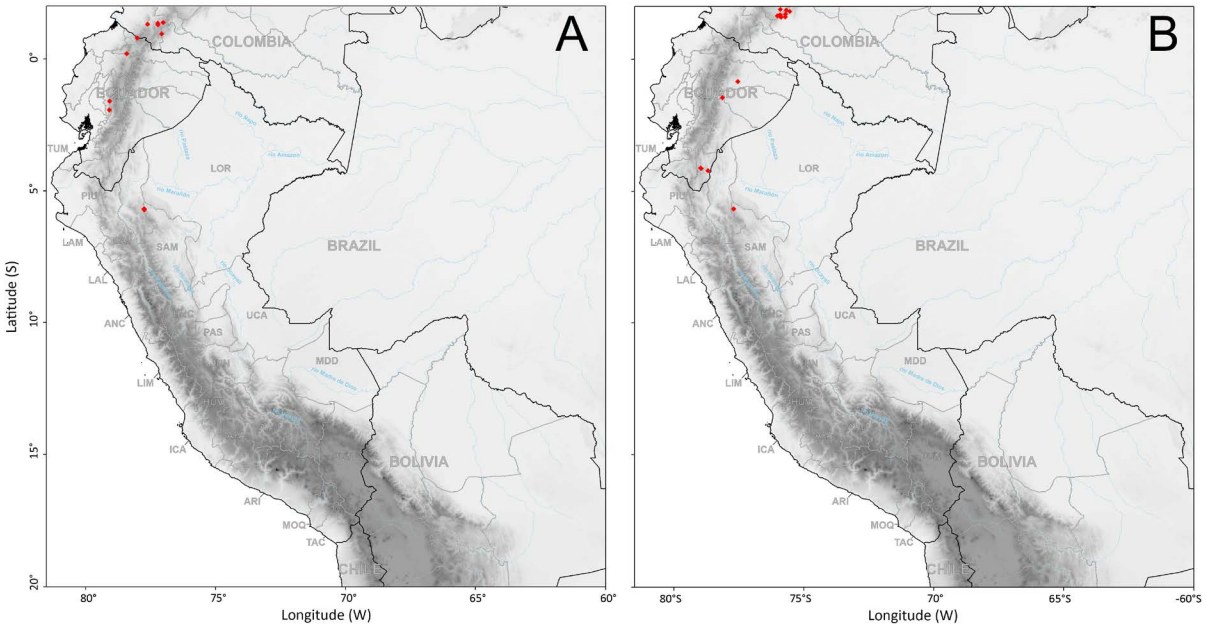


**Fig. 13.** Distribution of *Begonia* sect. *Apteron* C.DC. in Peru and surrounding countries. **A**. *B. pastoensis* var. *pastoensis* (red). **B**. *B. pedemontana* Moonlight sp. nov. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

**Proposed conservation assessment**

Known only from two small populations in Peru (< 20 individuals observed) but widespread and common across its Colombian and Ecuadorian range. Its total EOO is ca 135 000 km$^2$ and includes numerous protected areas. We assess *B. pastoensis* var. *pastoensis* as Least Concern (LC).

**Notes**

The three specimens we cite here are the first records of *B. pastoensis* var. *pastoensis* from Peru. We cannot be entirely confident about the identification of these specimens, as only a single, open staminate flower and single fruit but no pistillate flowers have been collected in Peru. In all vegetative respects however, these collections are indistinguishable from *B. pastoensis* var. *pastoensis*. This species and *B. exalata* C.DC. share a characteristic, semi-scandent to erect habit, a densely tomentose indumentum, and persistent, broadly lanceolate, reflexed stipules. It differs from *B. exalata* in its fewer-flowered inflorescences, which branch 3–4 times (compared to 5–6 times in *B. exalata*), its much larger outer tepals on the staminate flower (10–19 × 8–15 mm vs 4–6 × 2 mm), and its fruits that sometimes have wings (vs no wings). These three characters are evident on the limited fertile material available, so we feel reasonably confident in identifying this material as *B. pastoensis* var. *pastoensis*.

**Typification notes**

The protologue of *B. pastoensis* cites *J.J. Triana 3031* but no herbarium (de Candolle 1859: 121), so this this name required lectotypification. Smith & Schubert's treatment of the Begoniaceae for the Flora of

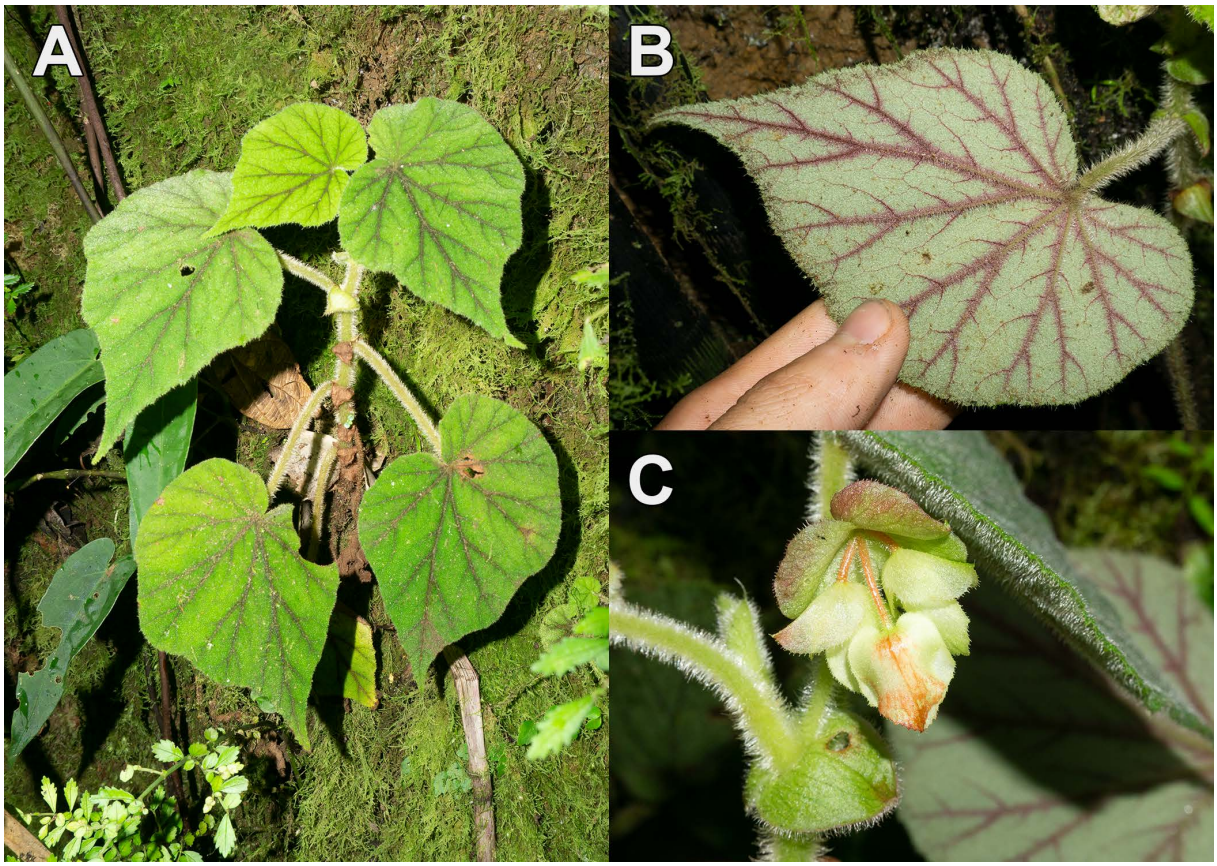


**Fig. 14.** *Begonia pastoensis* var. *pastoensis* A.DC. **A**. Habit. **B**. Leaf abaxial surface. **C**. Developing inflorescence. All photographs by P.W. Moonlight from *P.W. Moonlight 1265* in Rioja Province, San Martín Region.

Colombia (Smith & Schubert 1946b) cited a duplicate in K (K000536693) as the type. This constitutes an effective lectotypification. Smith (1973) later cited a duplicate in G as the holotype while Smith & Wasshausen (1979) cited the duplicate in K as the holotype. Both citations are irrelevant as they are predated by the earlier typification of Smith & Schubert (1946b).

**Identification notes**

*Begonia pastoensis* is most similar to Ecuadorian endemic *B. exalata* C.DC. These two species have frequently been confused on account of their densely villous indumentum and leaves of a similar size and colour. The inflorescences of *B. pastoensis* branch fewer times than those of *B. exalata* (3–4 times vs 4–6 times); the flowers of *B. pastoensis* are much larger (e.g., the staminate flower are 20–42 mm wide vs up to 12 mm wide); and the fruits are winged (vs without wings).

Within Peru, *B. pastoensis* is one of only a few species of *Begonia* with a densely long-villous indumentum to its stem. The other species with similar induments are tuberous (*B. heliantha*, *B. herrerae*) or rhizomatous (*B. erythrothrix* Tebbitt & Moonlight) or else have pinnately veined leaves (*B. hirta* (Klotzsch) L.B.Sm. & B.G.Schub.) or are diminutive annuals (*B. hirtella* Link).

**Distribution and ecology**

Found from Colombia, Ecuador, and Peru while *B. pastoensis* var. *hirsutior* L.B.Sm. is endemic to Venezuela. Within Peru, known from a single population in Rioja Province, San Martín Region (Fig. 13A). Found within middle montane forest at an elevation of 1700–1800 m a.s.l., and all collections have been made in the shade of extremely dense montane forests where *B. pastoensis* var. *pastoensis* was found growing through dense mats of mosses (Fig. 14A). In one locality (*P.W. Moonlight & A. Daza 156*) these mosses were growing over a limestone cliff whereas in another (*P.W. Moonlight 1265*) they were growing over a streamside bank and vegetation. The only flower of the species collected in Peru was found in July. The Peruvian records of *B. pastoensis* var. *pastoensis* represent a remarkable 500 km disjunction from the remainder of its range. This variety is primarily found from southern Colombia to Bolívar Province, Ecuador. All Ecuadorian records are from the western slope of the Andes and only a few Colombian collections are known form the eastern slope of the Andes. The Andean cordillera is a boundary to the dispersal of mid-elevation *Begonia* species, so it is difficult to explain how *B. pastoensis* var. *pastoensis* could have dispersed between Peru and the rest of its range.

2. ***Begonia pedemontana*** Moonlight sp. nov.
urn:lsid:ipni.org:names:77323285-1
Figs 6D, 13B, 15

*Begonia microcarpa* var. *acuta* L.B.Sm. & B.G.Schub., *Caldasia* 4 (17): 83 (Smith & Schubert 1946b). – **Type**: COLOMBIA – **Huila Department** • Cordillera Oriental, west slope below Gabinete in the valley of the Abra de San Andrés; [1°54′ N, 76°54′ W]; 1900–2100 m.a.s.l; 24 Mar. 1940; *J. Cuatrecasas 8606*; holotype: US [US00115393]; isotype: F [V0052633F]. **Syn. nov.**
Smith & Wasshausen (1986: 53).

*Begonia microcarpa* var. *villosa* L.B.Sm. & B.G.Schub., *Caldasia* 4 (17): 83 (Smith & Schubert 1946b). – **Type**: COLOMBIA – **Valle Department** • Comisaría del Caquetá. Cordillera Oriental, vertiente orielta. Surcre, orillas del río Hacha; [1°49′ N, 76°32′ W]; 1000 m a.s.l.; 3–7 Apr. 1940; *J. Cuatrecasas 9170*; holotype: US [US00115394]; isotype: COL [COL000003005]. **Syn. nov.**
Smith & Wasshausen (1986: 53).

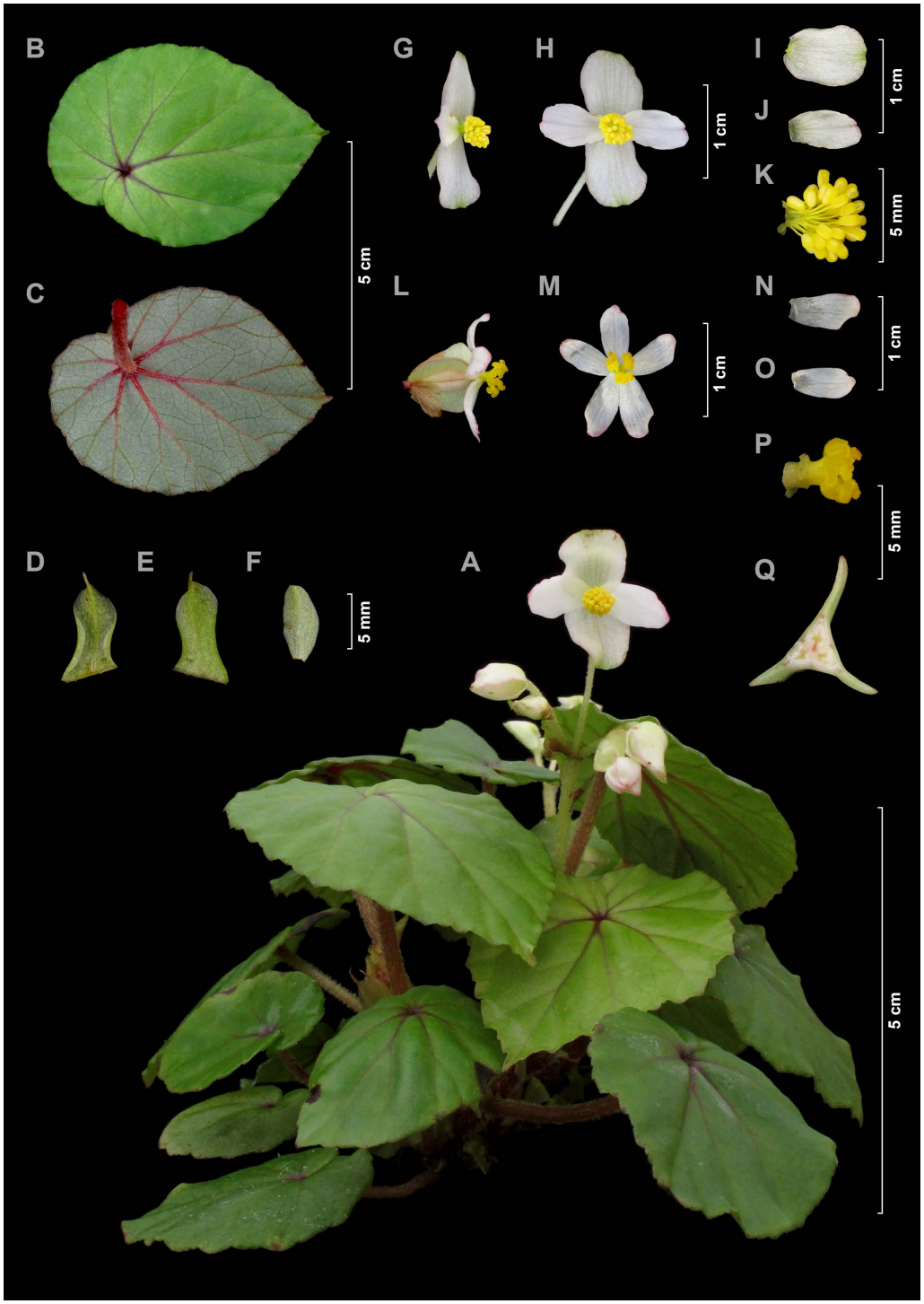


**Fig. 15.** *Begonia pedemontana* Moonlight sp. nov. **A**. Habit. **B**. Leaf, adaxial surface. **C**. Leaf, abaxial surface. **D**. Stipule, adaxial surface. **E**. Stipule, abaxial surface. **F**. Bract, adaxial surface. **G**. Staminate flower, side view. **H**. Staminate flower, front view. **I**. Largest petal of the staminate flower. **J**. Smallest tepal of the staminate flower. **K**. Androecium, side view. **L**. Pistillate flower, side view. **M**. Pistillate flower, front view. **N**. Largest tepal of the pistillate flower. **O**. Smallest tepal of the pistillate flower. **P**. Gynoecium, side view. **Q**. Cross section of the ovary. All photographs taken by D.A. Purvis in the living collections of the Royal Botanic Garden Edinburgh (Accession 20180927, grown from seeds collected as part of *P.W. Moonlight 1262*).

### Diagnosis

Most similar to *B. microcarpa* but differing in its leaves with fewer veins from the base (6–8 vs 8–10); its much fewer branched inflorescences (branching up to 4 times vs 5–6 times); its larger staminate (8–18 mm across vs 6–10 mm across) and pistillate flowers (8–22 mm across vs 4–6 mm across); and its larger ovaries (5–8 × 4 mm vs 2–3 × 2 mm).

### Etymology

The epithet derives from the Latin '*pedum montanum*' meaning 'foothills' and refers to the species' distribution along the lower slopes of the Andean Cordillera from Peru to Colombia.

### Type

PERU – **San Martín Region: Prov. Rioja** • Road from Amazonas to Rioja, km 393; 5°40′11″ S, 77°51′24″ W; 1335 m a.s.l.; 2 Feb. 2016; *P.W. Moonlight & A. Daza 159*; holotype: MOL; isotype: E.

### Other specimens examined

COLOMBIA – **Dept. Quindio** • Herveo, desvío carretera principal a Herveo; 5°05′10.3″ N, 75°13′06.8″ W; 2092 m a.s.l.; 3 Jan. 2013; *G. Morales, C. Ordoñez & J. Valencia 3473*; JBB • Municipio Calarcá, Corregimiento quebrada negra, vda. vista hermosa, finca la floresta; [4°31′ N, 75°36′ W]; 1650–2150 m a.s.l.; 2 Mar. 1991; *C.A. Agudelo, L.F. Hoyos, A.L. López & V.M. Agudelo 929*; COL [COL000138561]. – **Dept. Valle del Cauca** • Municipio El Cairo, reserva Cerro El Inglés, cerca de 1 km al occidente del centro de visitantes; 4°45′23.7–38.3″ N, 76°17′33–17′15.3″ W; 2217–2328 m a.s.l.; 21 Oct. 2013; *A. Jara & F. Ávila 2387*; ANDES. – **Dept. Valle** • Cali-Buenaventura Hwy, km 28 from Cali, "El Refugio", property of Eduardo Calderón; 3°28′ N, 76°38′ W; 900 m a.s.l.; 12 Feb. 1990; *T.B. Croat & J. Watt 70471*; MO [MO-1642394] • Municipio Cali, km 18 de la carretera Cali-Buenaventura, km 4 a Dapa, corregimiento de la Elvira; 3°30′ N, 76°34′ W; 1900 m a.s.l.; 24 Jan. 1994; *J. Giraldo-Gensini 144*; MO [MO-097752] • El Silencio, Yanaconas; 1900–2200 m a.s.l.; [3°25′ N, 76°36′ W]; 28 Feb. 1939; *E.P. Killip & H. Garcia 33768*; BM, COL [COL000138091], GH, US • El Silencio, Hacienda Himalaya, Cordillera Occidental W of Yumbo; 3°38′ N, 76°33′ W; 1850–1900 m a.s.l.; 3 Feb. 1989; *A.H. Gentry, R. Ruiz, S. Sarria & C. Galvis 65443*; MO [MO-1429730] • Argelia Municipality, Vereda Las Brisas, Finca San Jorge; 1850–1960 m a.s.l.; 22 Jan. 1983; S. Díaz-Piedrahita 3855; COL [COL000138627], MO [MO-097793] • Mountains above Cali; [3°29′ S, 75°36′ W]; 1676 m.a.s.l; 8 Aug. 1968; *F.A. Barkley 38C628*; COL [COL000138578]. – **Dept. Caquetá** • Municipio Florencia, Alto Gabinete, vía antigua Florencia-Neiva, vereda Tarqui; 1°52′08.6″ N, 75°40′19.8″ W; 1571 m a.s.l.; 29 Feb. 2016; *N. Marin, E. Paki, D. Daza & C. Ossa 2438*; COAH • Comisaría de Caquetá, east slope of Cordillera Oriental on road between Garzón and Florencia; [1°43′ N, 75°42′ W]; 1200 m a.s.l.; 21 Feb. 1949; *H.L. Mason* 13938; COL [COL000138090] • Municipio Belén de los Andaquíes, parque municipio natural Belén de los Andaquíes, camino Andaki; 1°41′16.3–28″ N, 75°54′07.9–22.7″ W; 1414–1460 m a.s.l.; 25 Jan. 2017; *J. Betancur, D. Cárdenas, N. Castãno-A., A. Barona, N. Marín, E. Paky, J. Navarro, O. Cerquera, A. Valencia, M. Rojas, B. Rojas, D.J. Jaimes, L.C. Luna, H. Muñoz & D. Osorio 20306*; COAH • Municipio Belén de los Andaquíes, camino Adanquí vía que comunica el municipio de Acevedo con Belén, quebrada el Quebradón; 1°41′26.4″ S, 75°54′23.7″ W; 1300 m a.s.l.; 9 Mar. 2016; *D. Cárdenas, N. Castaño, D. Daly, N. Marin, E. Paki, A. Castillo, E. Gutiérrez & O. Gascar 45805*; COAH • Municipio Belén de los Andaquíes, camino entre Acevedo–Belén, camino Adanquí, zona de cerro Aguacate; 1°39′22″ N, 75°54′24″ W; 1100–1550 m a.s.l.; 24 Jul. 2011; *D. Cárdenas, N. Castaño, X. Cornejo, N.R. Salinas, E. Gonzáles & E. Paki 41885*; COAH • Municipio Belén de los Andaquíes, parque municipio natural Belén de los Andaquíes, sector La Mina, quebrada la Esmerelda; 1°38′05.1″ N, 75°54′21.4″ W; 790 m a.s.l.; 3 Feb. 2017; *N. Castaño, D. Cárdenas, J. Betancur, A. Barona, N. Marin, E. Paky, J. Navarro, O. Cerquera, A. Valencia, M. Rojas, B. Rojas, D.J. Jaimes, L.C. Luna, H. Muñoz & D. Osorio 9423*; COAH • Municipio Florencia, corregimiento Santo Domingo,

vereda Villa Hermosa; 1°36′52″ N, 75°42′31.5″ W; 900 m a.s.l.; 2 May 2011; *N. Castaño, J.S. Barreto, M. Rodriguez, W. Trujillo-C., Y. Torres, N. Marin & E. Fiagama 3223*; COAH • Municipio Belén de los Andaquíes, corredor resguardo La Cernida, PNN Alto Fragua Indiguazi, etnia Emberia Katio; 1°36′08.6″ N, 75°51′49.1″ W; 680 m a.s.l.; 4 Oct. 2007; *W. Trujillo-C.A. Tascón, R. Alope Ch. WT962*; COAH. – **Dept. Huila** • Municipio Acevedo, Corregimiento de San Adolfo, vereda La Ilusión, corredor biológico Guacharos-Purace; 1°38′59.8″ N, 76°00′44.9″ W; 1390 m a.s.l.; *ND. Jiménez-Escobar & A. Avella-M. 1972*; COL.

ECUADOR – **Prov. Napo** • Parque Nacional Podocarpus, by waterfall right before Bombuscara administration; 4°07′ S, 78°58′ W; 1060 m a.s.l.; 1 Jul.–15 Dec. 1998; *M. Bjerrum 12*; AAU • Archidona Canton, Parque Nacional Sumaco Napo-Galeras; 0°50′09″ S, 77°31′58″ W; 1690 m a.s.l.; 5 Apr. 2003; *D. Cumacás 131*; QCNE. – **Prov. Morona-Santiago** • Cumandá 6 km W of Mera; [1°27′03″ S, 78°09′14″ W]; ca 1000 m a.s.l.; 14 Mar. 1980; *G. Harling & L. Andersson 17278*; GB. – **Prov. Zamora-Chinchipe** • Parque Nacional Podocarpus, entrada por el sector del río Bombuscaro. Collecciones a lo largo del sendero Urraquita Verde y sendero los Higuerónes; 4°06′55.2″ S, 78°58′02.6″ W; 1000 m a.s.l.; 20 Mar. 2015; *N. Zapata, W. Santillán & H. Namcela 35*; QCA • Along road from Zamora to Romerillos along río Jambué, 13.3 km E of río Bombuscaro Bridge in Zamora, 0.3 km E of Pituca; 4°08′04″ S, 78°56′37″ W; 1068 m a.s.l.; *T.B. Croat 91762*; MO [MO-2022839], QCNE • Nangaritza Canton, Región de la Cordillera del Cóndor, cuenca del alto río Nangaritza, las Orquídeas; 4°13′15″ S, 78°40′54″ W; 1100 m a.s.l.; *W. Quizhpe & F. Luisier 1924*; MO [MO-2135429], QCNE.

PERU – **San Martín Region: Prov. Rioja** • road from Amazonas to Rioja, km 393; 5°40′11″ S, 77°51′23″ W; 1297 m a.s.l.; 4 Jul. 2018; *P.W. Moonlight 1262*; E, USM.

**Description**

Caulescent herb, to 30 cm high. *Stem* trailing to erect, to 50 cm high, branching; internodes to 6.5 cm long, to 3 mm thick, wiry, pale green to red, villous to tomentose. *Stipules* persistent, triangular, 5–16 × 1–5 mm, apex acute to attenuate, translucent, pale green, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 3–12 cm long, red, tomentose; blade asymmetrical, ovate, to 13.5 × 10.5 cm, succulent, apex short-acuminate, base obliquely cordate, basal lobes not or slightly overlapping to overlapping, sinus to 25 mm deep, margin entire to undulate or rarely denticulate, occasionally with 1–3 cusps on the largest side of the lamina (never in Peru), aciliate, upper surface mid-green, glabrous, lower surface pale green, tomentose on the veins, glabrous on the lamina, veins palmate-pinnate, 6–8 veined from the base, with 2–4 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 2–4 branches, bearing up to 8 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 12 cm long, glabrous to tomentose, bracts deciduous, ovate, ca 5–12 × 2–5 mm, translucent, white to pale green, glabrous, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 17 mm long, tomentose; tepals 4, spreading, outer 2 oblanceolate to ovate, 4–9 × 4–7 mm, apex acute, white, glabrous, margin entire, aciliate, inner 2 elliptic, 4–9 × 2–4 mm, apex acute, white, glabrous, margin entire, aciliate; stamens ca 20–30, spreading, yellow, filaments 1–2 mm long, fused at the base, anthers obovoid, ca 0.4 × 0.3 mm long, dehiscing via lateral slits, connectives extending < 0.1 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 10 mm long; bracteoles 2, directly beneath the ovary, ovate, ca 4 × 4 mm, apex obtuse, translucent, white, glabrous, margin entire, aciliate; tepals 5, subequal, deciduous in fruit, spreading, lanceolate, 4–11 × 2–3 mm, apex rounded, white, glabrous, margin entire, aciliate; ovary body ovoid, 5–8 × 4 mm, pale green, glabrous, sub-equally 3-winged, the largest oblong to triangular 6–11 × 5–6 mm, smallest oblong 5–11 × 3–5 mm; 3-locular, placentae branches simple or divided, bearing ovules on both surfaces; styles 3, yellow, fused at the base, 2–3 mm long, reniform, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 20 mm long. *Fruit body* narrowly ovoid to ovoid, to 10 × 8 mm, drying pale brown,

wings same shape as in ovary, the largest expanding to 13 × 10 mm, the smallest expanding to 12 × 8 mm.

**Proposed conservation assessment**

Known only from one population in Peru (ca 500 individuals) but widespread and locally common across its Ecuadorian and Colombian range. Its EOO is almost 200 000 km$^2$, which includes significant areas of primary forest and several protected areas. We assess *B. pedemontana* sp. nov. as Least Concern (LC).

**Notes**

The placentation of *B. pedemontana* sp. nov. varies from simple to divided. Dissections of ovaries made in the field as part of the collection *P.W. Moonlight & A. Daza 159* show divided placentae, but plants grown in the Royal Botanic Garden Edinburgh from seeds of this collection showed entire ovaries (Fig. 15Q).

**Synonymy notes**

Since the collection of the type specimen of *B. microcarpa*, no specimens have been collected that match it. It was collected in September 1857 by Richard E. Spruce, most likely in the vicinity of Baños in Tungurahua Province, Ecuador, where he was based at this time (Richard Spruce Project 2005). It is unique among *B.* sect. *Apteron* in its combination of 10–12 veins from the base of its leaves (vs 5–10 veins); its inflorescences branching 5–6 times (vs 1–4 times).

Since the description of *B. microcarpa*, several specimens from Ecuador and Colombia have been collected that differ from the type in their larger staminate and pistillate tepals, their fewer branching inflorescences, and shorter stem internodes. They also differ from the other species in *B.* sect. *Apteron*, *B. pastoensis* and *B. exalata* in their indumentum (glabrous to villous vs densely hispid). Smith & Schubert (1946b) described *B. microcarpa* vars. *acuta* and *villosa* to accommodate these specimens, with the two varieties differing in relatively minor characters. We however consider their differences from *B. microcarpa* var. *microcarpa* sufficient to warrant species level recognition. We chose to create a new species rather than elevating *B. microcarpa* var. *acuta* to the species level because this variety was named for its acute stipules, which are common within the genus. We were unable to elevate *B. microcarpa* var. *villosa* to species level due to the earlier name *B. villosa* Lindl. We also note that a duplicate of the type specimen of *B. microcarpa* var. *acuta* held in COL (COL000003004) is not the same species as the other duplicates cited herein. This duplicate is in fact a specimen of distantly related *B. cymbalifera* L.B.Sm. & B.G.Shub.

**Identification notes**

*Begonia pedemontana* sp. nov. is most similar to *B. microcarpa* (see Diagnosis). Within Peru, *B. pedemontana* sp. nov. is unlikely to be confused with any other species even when sterile. It is one of only a few species that roots at the nodes, has a semi-scandent habit, and has basifixed leaves. It is most similar to *B. pastoensis* var. *pastoensis* but can be easily distinguished by its tomentose indumentum (vs villous). It is also a much smaller plant (e.g., the leaves are rarely larger than 8 × 5 cm vs up to 15 × 10 cm) and has uniformly pale green leaves (vs dark green leaves flushed black, flushed purple beneath). Furthermore, the staminate and pistillate flowers of *B. pedemontana* sp. nov. are much smaller (up to 14 and 22 mm across, vs up to 38 and 28 mm across, respectively). *Begonia pedemontana* sp. nov. could potentially be confused with a young individual of *B. glabra*, but this species is symmetrically 3-veined from the leaf base whereas *B. pedemontana* sp. nov. has at least 6 asymmetric veins from the leaf base.

### Distribution and ecology

Known from Colombia, Ecuador, and Peru. Within Peru, known from a single population in San Martín Region (Fig. 13B) and found in lower montane Forest at an elevation of ca 1300 m a.s.l. In Colombia and Ecuador, the species has been collected from 680–2150 m a.s.l. In Ecuador, it is found exclusively on the eastern flank of the Andes but in Colombia it is found on both flanks of the Western Cordillera. The type locality of *B. pedemontana* sp. nov. is a limestone outcrop and the species is found on lime-rich soils at the base of this outcrop; however, the species is most frequently described as growing on the base of tree trunks.

## ***Begonia*** sect. ***Australes*** L.B.Sm. & B.G.Schub.

*Darwiniana* 5: 80 (Smith & Schubert 1941b). – **Type**: lectotype: *Begonia micranthera* Griseb., designated by Barkley & Baranov (1972: 2).

### Notes

*Begonia* sect. *Australes* was treated as synonymous with *B.* sect. *Eupetalum* until it was reinstated by Moonlight *et al.* (2018) on the basis of phylogenetic data. The section was recently revised by Tebbitt (2020) and includes the majority of tuberous, caulescent species of Andean *Begonia* with large flowers and bifid styles. *Begonia* sect. *Australes* is most diverse in Bolivia and northwest Argentina, and we recognise three species from central and southern Peru.

### 3. ***Begonia heliantha*** Tebbitt

Figs 16, 17A

*Edinburgh Journal of Botany* 73 (1): 145 (Tebbitt 2016). – **Type**: PERU – **Puno Region: Prov. Sandia** • Entre Sandia y Tambopata; 1700–2200 m a.s.l.; [14°15′ S, 69°25′ W]; 7 Aug. 1965; *J.C. Vargas Calderón 16417*[a]; holotype: US [US01269467]; isotype: CUZ [2].
Tebbitt (2020: 69).

### Etymology

The epithet derives from the Greek words '*helios*' and '*anthos*', meaning 'sun' and 'flower'. This references the bright yellow, 'sun-like' flowers of the species.

### Specimens examined

PERU – **Puno Region: Prov. Sandia** • ca 17 km on road below Sandia; 14°13.684′ S, 69°24.736′ W; ca 1600 m a.s.l.; 16 Feb. 2002; *R.T. Pennington, T.D. Pennington & A. Daza 1113*; E [E00274868], K, MOL.

### Description

Caulescent, tuberous herb, to 20 cm high. *Tuber* ellipsoid, 1.1–2.5 × 1.1–2.5 cm, with one growing point. *Stem* erect, unbranched; internodes to 3.1 cm long, to 2 mm thick, succulent, red, sparsely pubescent. *Stipules* persistent, ovate, 1–3.5 × 0.5–2 mm, apex acute, aristate, opaque, brown, glabrous, margin fimbriate, ciliate. *Leaves* 3–6, alternate, basifixed; petiole 1.7–5 cm long, red, densely glandular-pubescent; blade asymmetric, ovate, to 10 × 5 cm, succulent, apex acute to acuminate, base obliquely cordate, basal lobes not overlapping, sinus to 15 mm deep, margin lacking lobes or shortly-lobed, lobes triangular-crenate, dentate, ciliate, upper surface green with paler veins, sometimes flushed black between the veins, moderately pubescent, lower surface pale green, densely pubescent on the major veins, moderately pubescent on the lamina, veins palmate but with 1 primary vein, 7–9 veined from the base, 1–3 secondary veins on the larger side, 1–2 on the smaller side. *Inflorescences* 1–3, bisexual,

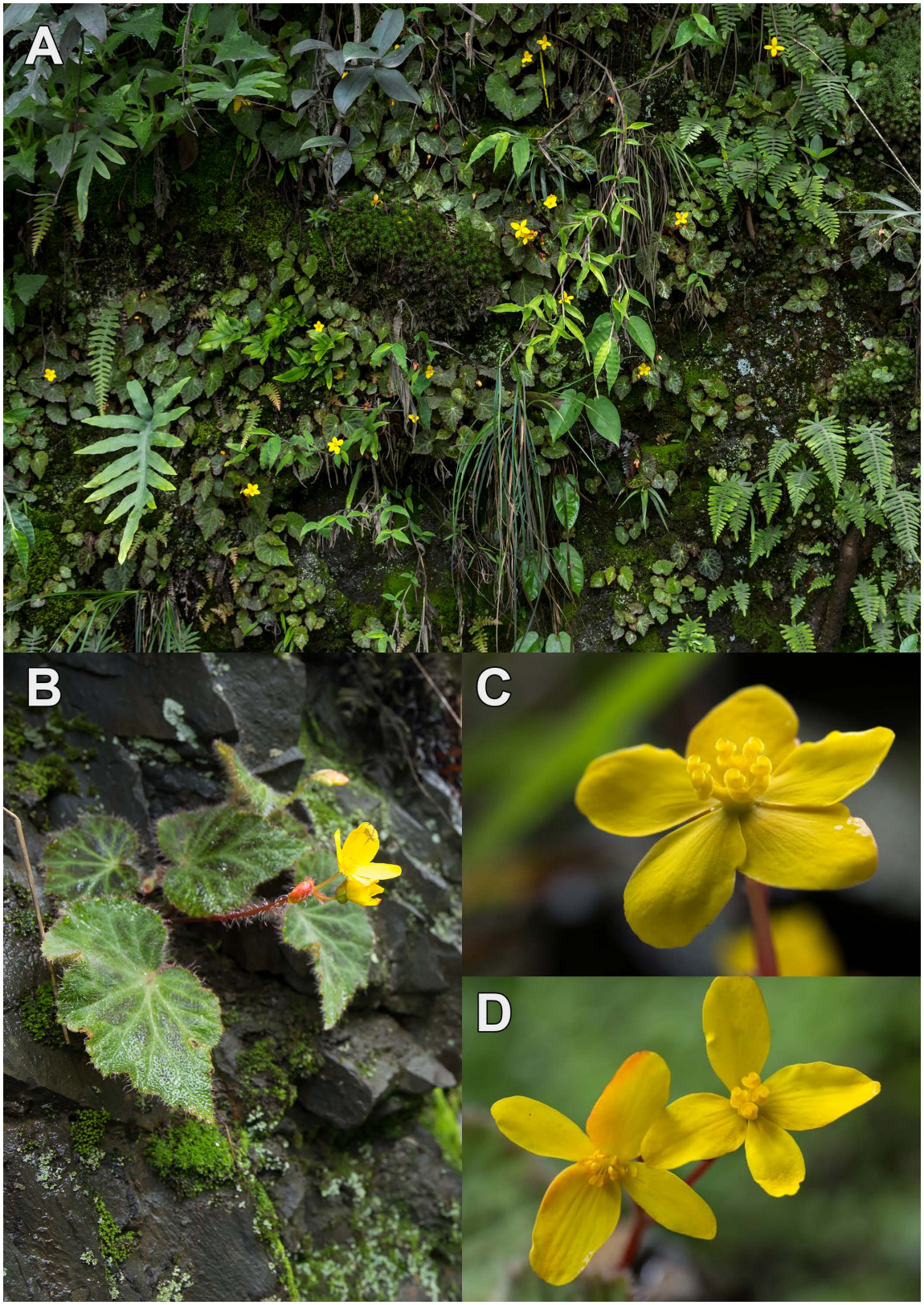


**Fig. 16.** *Begonia heliantha* Tebbitt. **A**. Habitat. **B**. Habit. **C**. Pistillate flower, oblique front view. **D**. Staminate and pistillate flower, front view (note, the pistillate flower is unusual in having four tepals and two styles). All photographs by J.P. Allen in Sandia Province, Puno Region.

axillary, erect, cymose, with up to 2 branches, bearing up to 3 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 16 cm long, red, moderately glandular-pubescent, bracts persistent, obovate to ovate, 1.25–6 × 0.5–4 mm, translucent, brown, glabrous, apex acute to rounded, margin lacerate, ciliate. *Staminate flowers*: pedicels to 15 mm long, moderately-pubescent; tepals 4, spreading, outer 2 elliptic to ovate, 8–20 × 5–11 mm, apex obtuse, bright yellow, glabrous, margin entire, aciliate, inner 2 narrowly-obovate, 8–15 × 3–7 mm, apex obtuse, bright yellow, glabrous, margin entire, aciliate; stamens 25–35, spreading, yellow, filaments 1–2 mm long, free, anthers cuboid, ca 1 × 0.5 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 14 mm long; bracteoles 2, positioned directly beneath the ovary, lanceolate to lanceolate-ovate, ca 2 × 1 mm, apex acute, opaque, colour unknown, glabrous, margin entire, ciliate; tepals 5, rarely 4 (Fig. 17D), subequal, deciduous in fruit, spreading, elliptic to ovate, 6–12 × 4–5 mm, apex obtuse, bright yellow, glabrous, margin entire, aciliate; ovary body ellipsoid to spheroid, 3–9 × 3–5 mm, red, glabrous, unequally 3-winged, wings triangular, largest 3–12 × 5–10 mm, smallest 3–5 × 3–5 mm; 3-locular, placentae unknown; styles 3, yellow, free, ca 4 mm long, once-divided, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 30 mm long. *Fruit body* ovoid, to 9 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding to 10 × 16 mm, the smallest expanding to 7 × 7 mm.

### Proposed conservation assessment

Assessed by Tebbitt (2016) as Data Deficient (DD). We have since visited the type locality and observed a stable population of ca 5 k plants growing along a 1 km stretch of the main 34H road through Sandia Province. It is likely that the population would decline rapidly if the road were improved, or the quantity of traffic increased, which would be grounds for reassessing the species as Critically Endangered. Accordingly, we assess *B. heliantha* as Vulnerable (VU D2) under IUCN criteria.

### Identification notes

Within Peru, *B. heliantha* is unique in its bright yellow flowers. When sterile, it could be confused with *B. herrerae*, which is also a tuberous herb with a pubescent indumentum and ovate, obliquely cordate leaves with an acuminate apex. They differ in their indumentum, which is glandular in *B. heliantha* and non-glandular in *B. herrerae*.

### Distribution and ecology

Endemic to Peru and Puno Region (Fig. 17A). Known from middle montane Forest at an elevation of 1600–2200 m a.s.l. *Begonia heliantha* has been collected on moist shaded rocks in February and August but as a tuberous species likely dies back at some point in the year.

## 4. ***Begonia herrerae*** L.B.Sm. & B.G.Schub.

Figs 17A, 18

*Revistas Científicas de la Universidad Andina del Cusco* 33 (87): 91 (Smith & Schubert 1944). – **Type**: PERU – **Cusco Region: Prov. Quispicanchis** • San Pedro, Marcapata; [13°26′ S, 70°54′ W]; 1200 m a.s.l.; 11 Dec. 1943; *J.C. Vargas Calderón 3720*; lectotype: GH [GH00068237], designated by Moonlight & Fuentes (2022); isolectotypes: CUZ [2]; LIL; MO [MO-2217106].

Brako & Zarucchi (1993: 193); León & Monsalve (2006: 166); Wasshausen *et al.* (2014: 385); Tebbitt (2020: 88).

### Etymology

The epithet means ‘Herrera’s *Begonia*’. The protologue does not mention any specific Herrera but we believe this refers to Fortunato L. Herrera, a Peruvian botanist who made significant contributions to the knowledge of the flora of Cusco Region and who died the year *B. herrerae* was published.

**Description**

Caulescent, tuberous herb, to 15 cm high. *Tuber* globose, ca 2 × 1.2 cm, with 1 growing point. *Stem* erect, rarely branching; internodes to 4.5 cm long, to 5 mm thick, succulent, colour unknown, densely hispid. *Stipules* late deciduous, triangular, 5–7 × 3–6 mm, apex acute, translucent, brown, sparsely hispid, margin serrate, long-ciliate. *Leaves* 4–6, alternate, basifixed; petiole 2–5.8 cm long, colour unknown, densely hispid; blade asymmetric, ovate, to 12 × 10.5 cm, membranaceous, apex acute to acuminate, base obliquely cordate, basal lobes overlapping, sinus to 25 mm deep, margin irregularly dentate, ciliate, upper surface green, hispid, lower surface pale green, densely hispid on the veins, hispid on the lamina, veins palmate but with 1 primary vein, 6–8 veined from the base, with 1–3 secondary veins on the larger side, 1–2 secondary veins on the smaller side. *Inflorescences* 1–4 per stem, bisexual, axillary, erect, cymose, with 1–2 branches, bearing up to 4 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 18 cm long, colour unknown, densely hispid, bracts deciduous, triangular, 5–6 × 4–6 mm, translucent, colour unknown, sparsely hispid, apex acute, margin lacerate, ciliate. *Staminate flowers*: pedicels to 15 mm long, hispid; tepals 4, spreading, outer 2 elliptic, ovate, or obovate, 12–22 × 6–19 mm, apex acute, orange or red, glabrous, margin serrate, ciliate, inner 2 elliptic to obovate, 12–25 × 4–17 mm, apex acute, orange or red, glabrous, margin entire, aciliate; stamens 13–25, spreading, yellow, filaments ca 1 mm long, free, anthers cuboid, ca 1 × 0.5 mm, dehiscing via lateral slits, connectives not extended, filaments symmetrically fixed to the back of the stamens. *Pistillate flowers*: pedicels to 15 mm long; bracteoles lacking; tepals 5, subequal, deciduous in fruit, spreading, the largest lanceolate, 10–15 × 5–7 mm, apex acute, orange or red, sparsely hispid, margin serrate, ciliate, the smallest elliptic, 10–16 × 5–10 mm, apex rounded, sparsely hispid, margin serrulate, ciliate; ovary body obovoid, 5–8.5 × 5–8 mm, colour unknown, glabrous, unequally 3-winged, wings triangular, largest 3–6.5 × 2–7 mm, smallest 2.5–6 × 0.5–2 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2.5–3 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to

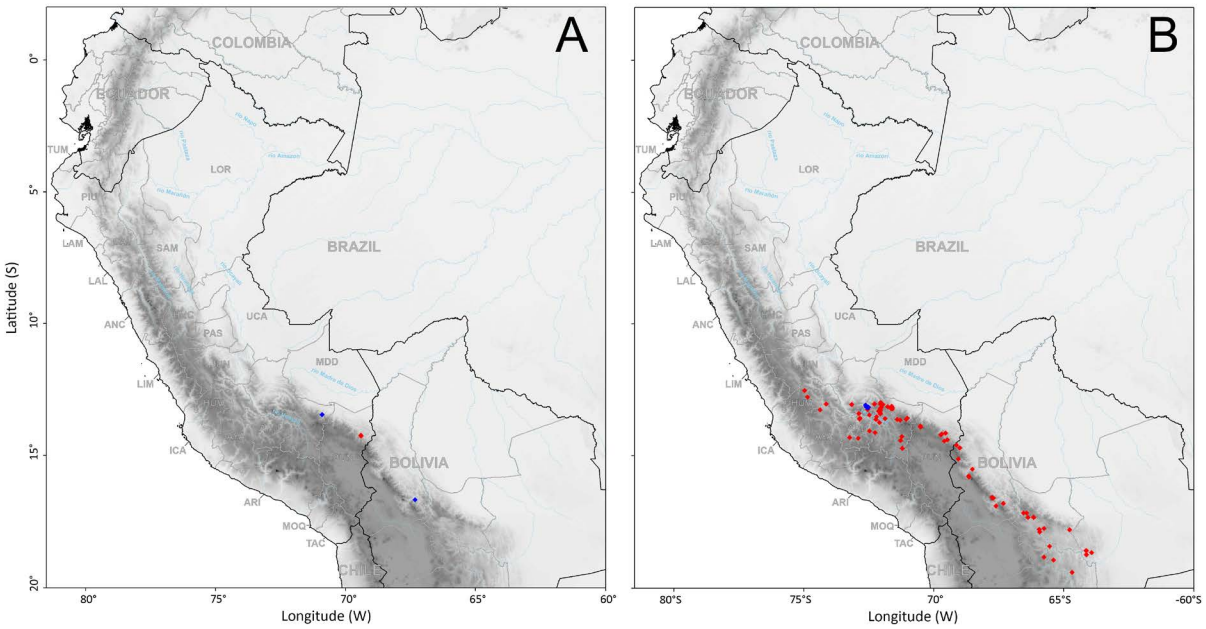


**Fig. 17.** Distribution of *Begonia* sect. *Australes* L.B.Sm. & B.G.Schub. in Peru and surrounding countries. **A**. *B. herrerae* L.B.Sm. & B.G.Schub. (red) and *B. heliantha* Tebbitt (blue). **B**. *B. veitchii* Hook.f. var. *veitchii* (red) and *B. veitchii* var. *machupicchuensis* Tebbitt (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

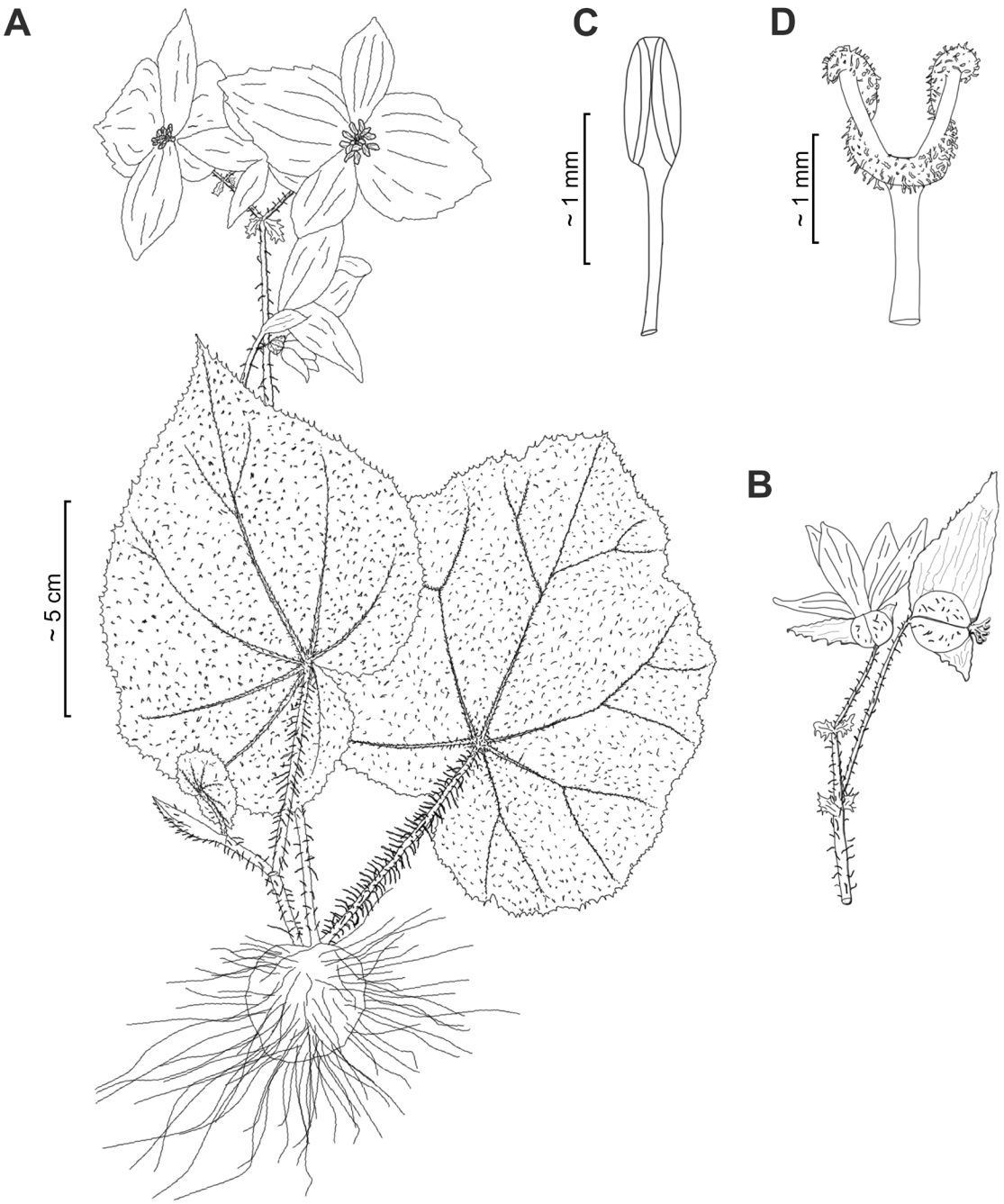


**Fig. 18.** *Begonia herrerae* L.B.Sm. & B.G.Schub. **A**. Habit. **B**. Inflorescence. **C**. Stamen, front view. **D**. Style and stigma, front view. Illustration adapted from Smith & Schubert (1945: fig. 15), digitally remastered by P.W. Moonlight.

20 mm long. *Fruit body* ovoid, to 8.5 × 9 mm, drying light brown, wings same shape as in ovary, the largest expanding to 11 × 21 mm, the smallest expanding to 8 × 5 mm.

### Proposed conservation assessment

Previously assessed as Data Deficient (DD) by León & Monsalve (2006), who cited only the type specimen. A second collection has since been identified from ca 530 km to the southwest in La Paz Province in Bolivia (Tebbitt 2020). We have not observed *B. herrerae* in the wild and have no data on population sizes or trends. The lower montane forests between its two collections are poorly collected so there may be many uncollected populations in this area. We assess *B. herrerae* as Data Deficient (DD).

### Identification notes

Most similar to *B. heliantha* but differing in the serrated margin to its staminate flowers.

### Distribution and ecology

Known from Bolivia and Peru. Within Peru, it has been collected in Madre de Dios and Cusco Regions (Fig. 17A). Found in Amazonia at an elevation of 200–320 m a.s.l. in habitats described as sandy or rocky hills. *Begonia herrerae* is tuberous and likely dies back to its tuber at some point during the year. All known collections of the species have been collected from August to November, which represents the end of the dry season. It is unclear however whether this is the result of collection bias.

## 5. ***Begonia veitchii*** Hook.f.

*The Gardners' Chronical and Agricultural Gazette* I: 734 (Hooker 1867a). – **Type**: PERU • On hills from Cuzco to Ayacucho from Habaspamba; 3350–3660 m a.s.l.; Jan. 1867; *R. Pearce s.n.*; lectotype: K [K000252032], designated by Tebbitt *et al.* (2020: 130).

### Key to the varieties of *Begonia veitchii*

1a Tepals spreading, white, pink, or red; tepals on the pistillate flower narrowly ovate to ovate..... ***Begonia veitchii*** var. ***veitchii*** **5.1**

1b Tepals projecting, red; tepals on the pistillate flower elliptic, broadly ovate, orbicular, or broadly obovate..... ***Begonia veitchii*** var. ***machupicchuensis*** Tebbitt **5.2**

## 5.1 ***Begonia veitchii*** var. ***veitchii***

Figs 17B, 19

Hooker (1867b: t. 5663); von Regel (1885: 21); Smith & Schubert (1944: 77); Wasshausen *et al.* (2014: 386); Tebbitt *et al.* (2020: 127); Tebbitt (2020: 123).

*Begonia coriacea* A.DC. (nom. illeg.; later homonym non Haask.), *Annales des Sciences Naturelles Botanique, Série 4* 11: 122 (de Candolle 1859). = *Begonia tominana* Golding, *Phytologia* 47: 295 (Golding 1980). – **Type**: BOLIVIA – **[Dept. La Paz]: Prov. Tomina** • Pombabamba; [20°06′ S, 64°25′ W]; Dec. 1845–Jan. 1846; *H.A. Weddell 3791*; lectotype: P [P00482209], designated by Tebbitt *et al.* (2020: 130); isolectotype: P [P01900758].

Grisebach (1879: 136).

*Begonia clarkei* Hook.f., *Curtis's Botanical Magazine* 93: t. 5675 (Hooker 1867c). – **Type**: BOLIVIA – **[Dept. La Paz]: Prov. Larecaja** • viciniis Sorata, cerro del Iminapi; [15°46′ S, 68°39′ W]; 2650–2800 m a.s.l.; 16 Feb. 1858; *G. Mandon 1090*; lectotype: K [K000252024], designated by Tebbitt *et al.* (2020: 130); isolectotypes: BM, G [G00034147], G-BOIS, GH [GH0057802], K [K000252025], NY [NY01085842], P [P00482213, P05494708, P06602680, P06602681], RB [RB00536678], S [S07-9359], US [US00313506], W [W0013092, W18890113269].

Smith & Schubert (1941a: 186, 1944: 78); Smith & Wasshausen (1984: 466); Wasshausen *et al.* (2014: 384).

*Begonia rosiflora* Hook.f., *Curtis's Botanical Magazine* 93: t. 5680 (Hooker 1867d). = *Begonia veitchii* forma *rosiiflora* (Hook.f.) Voss, *Vilmorin's Blumengärtnerei* 1: 354 (Voss 1894). – **Type**: lectotype: plate in Hook.f., *Curtis's Botanical Magazine* 93: t. 5680(Hooker 1867d), designated by Tebbitt *et al.* (2020: 131).

Smith & Schubert (1941a: 204); Tebbitt *et al.* (2020: 131).

*Begonia baumannii* Lemoine, *Le Jardin* 4: 273 (Lemoine 1890). – **Type**: lectotype: plate in Lemoine, *Jardin* 4: 273, 1890, designated by Tebbitt *et al.* (2020: 131).

Wittmack (1891: 47); Hooker (1897: t. 7540); Smith & Schubert (1944: 77).

*Begonia barborkae* J.J.Halda, *Acta Musei Richnoviensis, Sect. Natur.* 14 (4): 105 (Halda *et al.* 2007). – **Type**: BOLIVIA – **Dept. Chuquisaca: Prov. Oropeza** • wet vertical rocks near Challcha; [18°26′ S, 65°32′ W]; 2900 m a.s.l.; 18 Nov. 2007; *J.J. Halda JJH07111801*; holotype: [PR no. 11970].

Wasshausen *et al.* (2014: 386); Tebbitt *et al.* (2020: 131).

*Begonia odoratissima* hort. ex Lemoine (nom. inval.; nom. rej. pro syn. *Begonia baumannii* Lemoine), *Le Jardin* 4: 273 (Lemoine 1890).

*Begonia cinnabarina* Hook. pro parte in Smith & Schubert (1941a: 186).

### Etymology

Richard Pearce collected the type specimen of the species during an expedition funded by the Veitch nursery. It is unclear which member of the Veitch family that Joseph Dalton Hooker intended to honour with the epithet.

### Selected specimens examined

PERU – **Ayacucho Region: Prov. La Mar** • Dist. San Miguel, Aypacorral, camino a Uras; [13°03′ S, 73°09′ W]; 3100–3800 m a.s.l.; 4 Apr. 2005; *J. Roque 4709*; USM. – **Prov. Ayacucho: Prov. Huamanga** • Arriba de Ayacucho; [13°02′ S, 74°08′ W]; 3300 m a.s.l.; 31 Dec. 1966; *O. Tovar 5647*; USM • Pampa de Chupas; [13°15′ S, 74°22′ W]; 10 Feb. 1968; *J.J. Soukup 5513*; US [2: US00222042, US00222043]. – **Apurímac Region: Prov. Abancay** • Gully of road above Abancay, left side of road Zuombo–Cuzco; [13°36′ S, 72°51′ W]; ca 3200 m a.s.l.; 4 Jan. 1962; *S.G.E. Saunders 745*; K. – **Prov. Aymaraes** • Dist. Chalhuanca, ca 1 km beyond Chalhuanca towards Caraybamba; [14°18′ S, 73°14′ W]; 2895 m a.s.l.; 6 Jan. 1962; *S.G.E. Saunders 766*; K. – **Prov. Grau** • Alrededores Cotabambas; [14°07′ S, 72°15′ W]; 3500 m a.s.l.; 1 Mar. 1946; *J.C. Vargas Calderón 5669*; CUZ. – **Cusco Region: Prov. Calca** • Dist. Yanatile, above intersection of roads coming from Amparaes, Quebrada Honda, and Lares, along road to Amparaes; 12°58′40″ S, 72°02′39″ W; 2659 m a.s.l.; 5 Jan. 2015; *M.C. Tebbitt & A. Daza 798*; E [E01059307], MOL • Dist. Lares, Choquecancha, Manto; 13°00′ S, 72°01′ W; 3161 m a.s.l.; 20 Feb. 2005; *L. Valenzuela & E. Suclli 5053*; MO [MO-1663843] • Dist. Lares, Pampacorral between Calca and Lares; 13°08′58″ S, 72°19′00″ W; 3660 m a.s.l.; 5 Jan. 2015; *M.C. Tebbitt & A. Daza 795*; E [E01059309], MOL. – **Prov. Paucartambo** • Hacienda Churu, 'Achanccaray'; 2500 m a.s.l.; Jan. 1926; *F.L. Herrera 1042*; US [US00222337] • Tres Cruces, Parque Nacional Manu; [13°07′ S, 71°37′ W]; 3500–3600 m a.s.l.; 7 Mar. 1991; *A. Cano 4636*; USM • Dist. Kosñipata, road from Paucartambo to Manu National Park; 13°10′ S, 71°35′ W; 3088 m a.s.l.; *M.C. Tebbitt & A. Daza 819*; E [E01059303], MOL • Valle del Pilcopata, near Accanaco Pass, turnoff to Tres Cruces; 13°13′ S, 71°35′ W; 3500 m a.s.l.; 15 Dec. 1983; *R.B. Foster & T. Wachter 7542*; NY, USM, MO [MO-2228046]. – **Prov. La Convención** • Dist. Santa Teresa, Choquequiraw, San Ignacio; 13°13′ S, 72°31′ W; 3250 m a.s.l.; 7 Mar. 2005; *E. Suclli, J. Farfán, V. Chama, C. Astete, J. Latorre & N. Anaya 2186*; MO [MO-1835493] • Dist. Santa Teresa, Choquequiraw, Santa Rosa; 13°14′ S, 72°31′ W; 2950 m a.s.l.; 5 Mar. 2005; *E. Suclli, J. Farfán, V. Chama, C. Astete, J. Latorre & N. Anaya 2077*; MO [MO-1835491] • Dist. Santa Teresa, Choq'ekiraw; 13°23′26″ S, 72°52′30″ W; 3270–3257 m a.s.l.; 18 May 2004; *L. Valenzuela, G. Calatayud, J. Farfán,*

*Y. Vizcardo, A. Reynaga et al. 3538*; MO [MO-1664173], US [US00900535]. – **Prov. Urubamba** • Lower end of quebrada Pumahuanca, a steep sided valley of r. Urubamba ca 2–4 km NW of Urubamba; 13°12′ S, 72°03′ W; 3200–3600 m a.s.l.; 31 Dec. 1962; *H.H. Iltis, G.M. Iltis, D. Ugent & V. Ugent 1004*; US [US00222333] • Dist. Huayllabamba, Yanaccocha, Quellococha; 13°16′24″ S, 72°02′59″ W; 3950–4406 m a.s.l.; 17 Feb. 2006; *L. Valenzuela, J. Farfán, E. Suclli, I. Huamantupa & R. Ayerbe 5977*; MO [MO-2183896], US [US00951220] • Trail from Chinchero Plaza to Antakillqa hillside; 13°24′ S, 72°03′ W; 3600 m a.s.l.; 13 Jan. 1982; *E.W. Davis, E. Franquemont, C. Franquemont, S. King & C. Sperling 1443*; USM. – **Prov. Anta** • Cuesta Limatambo; [13°27′ S, 72°28′ W]; 3200–3500 m a.s.l.; 24 Dec. 1948; *J.C. Vargas Calderón 7485*; US [US00222041]. – **Prov. Cusco** • Dist. San Jerónimo, road from Cusco to Paruro; 13°35′ S, 71°52′ W; 3570 m a.s.l.; *M.C. Tebbitt & A. Daza 824*; E [E01059304], MOL. – **Prov. Canchis** • Distrito Combapata, Palcoyocc; 14°03′51″ S, 71°20′16″ W; 3840–4000 m a.s.l.; 17 I 2007; *L. Valenzuela, E. Suchlli, J. Farfán & A. Carazas 8292*; E [E01007269] • Al este de Sicuani, margen derecha del río; 14°16′ S, 71°13′ W; 3450 m a.s.l.; 28–29 Mar. 1988; *P. Núñez* 8919; MO [MO-2228054]. – **Prov. Quispicanchis** • Dist. Ocongate, road to Marcapata, close to village of Ocongate; 13°37′ S, 72°24′ W; 3597 m a.s.l.; 8 Jan. 2015; *M.C. Tebbitt & A. Daza 804*; E [E01059308], MOL • Sicueni; [14°16′ S, 71°13′ W]; 3350 m a.s.l.; Jan. 1934; *D. Stafford 262*; K • Dist. San Pablo, quebrada de San Pablo, Pajonal; 14°71′35″ S, 71°20′37″ W; 3500–3600 m a.s.l.; 4 Feb. 2004; *G. Calatayud & E. Suclli 2068* (MO [MO-1104258]. – **Huancavelica Region: Prov. Huancavelica** • Motcca, 4 km SE de Conaica; [12°31′ S, 74°58′ W]; 3400–3500 m a.s.l.; Mar. 1951; *O. Tovar 250*; US [US00222334], USM • Yauli; [12°46′ S, 74°51′ W]; 3500 m a.s.l.; 11 Mar. 1939; *H.E. Stork & O.B. Horton 10871*; K. – **Puno Region: Prov. Carabaya** • Near Ollachea at km 216+700 on Carretera Transoceana, before tunnel Yana Negra, Accobamba; 13°52′33″ S, 70°30′51″ W; 3588 m a.s.l.; 11 Dec. 2017; *T. Sarkinen, S. Gamboa & W. Perez 5335*; E [E01007201] • Dist. Ollanchea, road between Macusani and Ollanchea; 13°53′21″ S, 70°30′38″ W; 3856 m a.s.l.; 11 Jan. 2015; *M.C. Tebbitt & A. Daza 816*; E, MOL. – **Prov. Sandia** • Ura-ayllu, trail on W-facing slope above quarry; 14°08′ S, 69°32′ W; 3510 m a.s.l.; 25 Jan. 1986; *B. Bennett 1991*; NY [2: NY01159121] • 2–6 km S of Limbani; [14°10′ S, 64°41′ W]; 3550–3650 m a.s.l.; 11–12 May 1942; *R.D. Metcalf 30460*; G, GH, US [US00222338] • Dist. Cuyocuyo, between Cuyocuyo and Sandia; 14°26′16″ W. 65°35′19″ W; 3912 m a.s.l.; 10 Jan. 2015; *M.C. Tebbitt & A. Daza 812*; E [E01059305], MOL.

**Description**

Acaulescent or caulescent, tuberous herb, to 40 cm high. *Tuber* spheroid to ellipsoid, sometimes branching, 3–6 × 1–4 cm, with 1–3 growing points. *Stem* erect, rarely branching; internodes to 1.5 cm long, to 11 mm thick, succulent, pale green flushed red, glabrous to tomentose. *Stipules* persistent, triangular to ovate, 9–13 × 3–10 mm, apex acute, obtuse, green to brown, glabrous, margin entire, aciliate. *Leaves* 1–5, alternate, basifixed; petiole 2–11 cm long, pale green to red, glabrous to densely villous; blade subsymmetric, broadly ovate, to 15 × 7 cm, succulent, apex indistinct to rounded, base cordate, basal lobes not overlapping to overlapping, sinus to 35 mm deep, margin dentate to crenate, ciliate, upper surface green to dark green, sometimes with a red margin, glabrous to sometimes sparsely pilose or villous towards the margin, lower surface pale green to purple, glabrous to villous or lanate between the veins, sparsely to densely villous on the veins, veins palmate, 6–11 veined from the base. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, a dichasial or monochasial cyme, with 3 branches, bearing up to 3 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 50 cm long, red, glabrous to densely villous, bracts late deciduous, elliptic to broadly obovate, 10–15 × 3–8 mm, opaque, white, pink, or red, glabrous, apex truncate to rounded, margin entire, aciliate to sparsely ciliate. *Staminate flowers*: pedicels to 30 mm long, glabrous; tepals 4, spreading, outer 2 ovate to broadly ovate, 22–48 × 21–35 mm, apex rounded, white, pink, or red, glabrous, margin entire, aciliate, inner 2 elliptic to broadly obovate, 22–54 × 21–32 mm, apex rounded, white, pink, or red, glabrous, margin entire, aciliate; stamens 65–80, spreading, yellow, filaments 1–5 mm long, fused at the base, anthers obovoid, 1–1.5 × 0.5 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed.

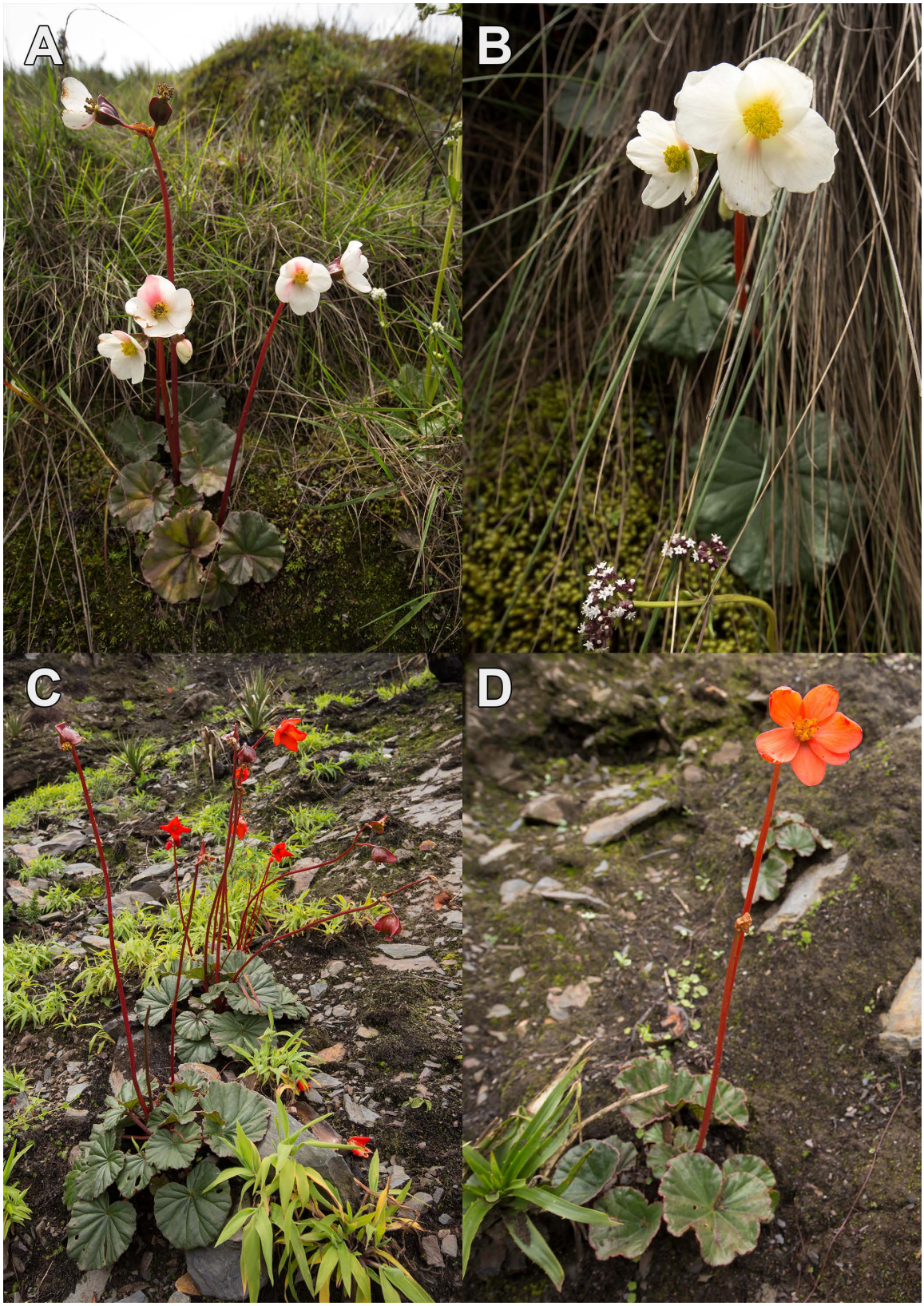


**Fig. 19.** *Begonia veitchii* Hook.f., showing variation in tepal colour. **A**. Habit, tepals white flushed pink. **B**. Habit, tepals white. **C**. Habit, tepals vivid red. **D**. Habit, tepals pale red (note, the pistillate flower is unusual in having six tepals). All photographs by J.P. Allen in Sandia Province, Puno Region.

*Pistillate flowers*: pedicels to 30 mm long; bracteoles absent to 3, positioned directly beneath the ovary, lanceolate, 9–11 × 4–6 mm, apex acute, opaque, white, pink, or red, glabrous, margin entire to serrulate, aciliate to ciliate; tepals 5, subequal, late deciduous in fruit, spreading, elliptic to broadly obovate, 10–30 × 8–32 mm, apex rounded, white, pink, or red, glabrous, margin entire, aciliate; ovary body obovoid, 8–11 × 6–11 mm, white, pink, or red, glabrous, unequally 3-winged, wings triangular, largest 8–11 × 3–10 mm, smallest 5–14 × 2–5 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 4–6 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 35 mm long. *Fruit body* obovoid, to 15 × 14 mm, drying brown, wings same shape as in ovary, the largest expanding to 20 × 24 mm, the smallest expanding to 20 × 15.

**Proposed conservation assessment**

Widespread and common throughout its Peruvian and Bolivian range with a total EOO of > 350 000 km$^2$, which includes several protected areas. This variety is frequently collected in disturbed grasslands and pastures. We assess *B. veitchii* var. *veitchii* as Least Concern (LC).

**Identification notes**

*Begonia veitchii* var. *veitchii* is very common across its range and can be treated as the most likely taxon for any tuberous *Begonia* collected in Ayacucho or further south, particularly at elevations above 3000 m a.s.l. It is recognised by its leaves which lack a distinct apex, by its large, open staminate and pistillate flowers, and its staminate flowers with four tepals.

**Distribution and ecology**

Known from Peru and Bolivia. Within Peru, collected in Ayacucho, Apurímac, Cuzco, Huancavelica, and Puno Regions (Fig. 17B). Found in high elevation grasslands at an elevation of 2650–4020 m a.s.l.

### 5.2 ***Begonia veitchii*** var. ***machupicchuensis*** Tebbitt
Fig. 17B

*Edinburgh Journal of Botany* 77 (1): 141 (Tebbitt *et al.* 2020). – **Type**: PERU – **Cusco Region: Prov. La Convención** • Dist. Santa Teresa, road from Santa Teresa, overlooking hydroelectric station; 13°08′ S, 72°35′ W; 1615 m a.s.l.; 7 Jan. 2015; *M.C. Tebbitt 802*; holotype: MOL; isotype: E.
Tebbitt (2020: 135).
*Begonia cinnabarina* auct. non Hook. in Brako & Zarucchi (1993: 191).
*Begonia clarkei* auct. non Hook.f. in Brako & Zarucchi (1993: 191).

**Etymology**

This variety has most frequently been collected at the ruined Incan city Machu Picchu and is endemic to the surrounding area. It is named for this locality.

**Specimens examined**

PERU – **Cusco Region: Prov. La Convención** • Dist. Echarate, roadside from 3–4 km south of Palma Real to Kiteni; 12°36′ S, 72°42′ W; 710 m a.s.l.; 6 Jan. 2015; *M.C. Tebbitt & A. Daza 800*[a]; E • Dist. Santa Teresa, road from Santa Maria to Santa Teresa, ca 4–5 km from Santa Maria; 13°04′ S, 72°37′ W; 1445 m a.s.l.; 6 Jan. 2015; *M.C. Tebbitt & A. Daza 801*; E [E01059310], MOL. – **Prov. Urubamba** • Dist. Machu Picchu, alrededores de Machu Picchu; [13°10′ S, 72°32′ W]; ca 2600 m a.s.l.; 17 Sep. 1939; *H.G. Barclay 9276*; MO [MO-2601961] • ibid.; 2400 m a.s.l.; 18 Nov. 1947; *R. Ferreyra 2679*; MO [MO-2218583], US [2: US00222335, US00222336], USM • ibid.; 1980 m a.s.l.; 12 Nov. 1957; *D. Stafford 1065*; BM, K • ibid.; 2200 m a.s.l.; Oct. 1931; *F.L. Herrera 3275*; US [US00222040] • ibid.;

2300 m a.s.l.; 6 Nov. 1984; *Exp. Client Univ. Varsovia 7*; USM • ibid.; 2133 m a.s.l.; Dec. 1942; *C. Sandeman 3626*; K, OXF • ibid.; 2300 m a.s.l.; 24 Sep. 1936; *J. West 8025*; MO [MO-1642900] • ibid.; Pampacahua; 13°07′ S, 72°16′ W; 2465 m a.s.l.; *L. Valenzuela, E. Suclli, J. Farfán, V. Chama & N. Anaya 4778*; MO [MO-1663834] • ibid.; entre Winayhuayna e Intipunco; 13°09′ S, 72°31′ W; 2900 m a.s.l.; 26 Oct. 1987; *P. Núñez V. 8411*; MO [MO-2228043] • Dist. Machu Picchu, puente Carrilluhuayoc; 13°09′06″ S, 72°34′43″ W; 1980 m a.s.l.; 19 Jan. 2008; *J. Farfán & V. Chama 1946*; MO [MO-2227420].

**Description**

Acaulescent or caulescent, tuberous herb, to 35 cm high. *Tuber* spheroid to ellipsoid, sometimes branching, 3–6 × 1–4 cm, with 1–3 growing points. *Stem* erect, rarely branching; internodes to 3.5 cm long, to 5 mm thick, succulent, green flushed red, sparsely pubescent. *Stipules* persistent, triangular, 15–20 × 4–6 mm, apex acute, opaque, brown flushed red, glabrous to sparsely pubescent, margin entire, aciliate. *Leaves* 3–5, alternate, basifixed; petiole 8–12 cm long, green flushed red, glabrous to sparsely pubescent; blade asymmetrical, transversely ovate, to 19 × 14.5 cm, succulent, apex indistinct to obtuse, base cordate, basal lobes overlapping, sinus to 50 mm deep, margin crenate to dentate, ciliate, upper surface green, glabrous to sparsely pilose at the edge of the lamina, lower surface pale green, sparsely woolly, veins palmate, 6–8 veined from the base. *Inflorescences* 1–3, bisexual, axillary, erect, a dichasial or monochasial cyme, with 2 branches, bearing up to 4 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 36 cm long, bright red, glabrous, bracts deciduous, obovate, ca 13 × 7 mm, translucent, white flushed scarlet to scarlet, glabrous, apex rounded, margin entire, aciliate. *Staminate flowers*: pedicels to 8 mm long, glabrous; tepals 4, projecting, outer 2 narrowly ovate to ovate, 12–27 × 10–18 mm, apex rounded to obtuse, scarlet, glabrous, margin entire, aciliate, inner 2 obovate, 12–31 × 8–20 mm, apex obtuse, scarlet, glabrous, margin entire, aciliate; stamens 70–80, spreading, yellow, filaments 2–4 mm long, irregularly fused at the base, anthers obovoid, ca 1 × 0.5 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 18 mm long; bracteoles absent or 1, 1 mm below the ovary, elliptic, ca 1 × 0.5 mm, apex obtuse, opaque, red, glabrous, margin entire, aciliate; tepals 5, subequal, deciduous in fruit, projecting, elliptic to broadly obovate, 11–30 × 4–32 mm, apex rounded, scarlet, glabrous to densely pubescent, margin entire, aciliate; ovary body ovoid, 4–13 × 5–12 mm, green flushed red, glabrous to densely pubescent, unequally 3-winged, wings triangular, largest 7–15 × 4–12 mm, smallest triangular 6–14 × 4–9 mm wide; 3-locular, branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 5 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 56 mm long. *Fruit body* obovoid, to 10 × 11 mm, drying brown, wings same shape as in ovary, the largest expanding to 14 × 15 mm, the smallest expanding to 13 × 10 mm.

**Proposed conservation assessment**

Known from a small area surrounding and partially protected by the Historic Sanctuary of Machu Picchu. Its EOO is 44 km$^2$, but it is well collected and frequently observed (e.g., 48 observations on iNaturalist, October 2020). This reflects how well visited Machu Picchu is, not the rarity of the variety, which is vulnerable because it is known only from one locality. We assess *B. veitchii* var. *machupicchuensis* as Vulnerable (VU D2).

**Notes**

The duplicate *M.C. Tebbitt & A. Daza 800*[a] arrived in E herbarium as part of a collection of *B. urubambensis*. The locality described here is not suitable for *B. veitchii* var. *machupichuensis* and this is most likely the result of a label mix-up.

### Identification notes

Recognised as one of only two tuberous Peruvian taxa with red, projecting tepals. The other is *B. polypetala* A.DC., which has acute apices to its tepals (vs rounded to obtuse) and > 5 tepals on its staminate flowers (vs 5).

### Distribution and ecology

Endemic to Peru and Cusco Region (Fig. 17B). Known from middle and upper montane forest at an elevation of 1980–2900 m a.s.l. The vivid red flowers of *B. veitchii* var. *machupicchuensis* and its projecting tepals suggest this variety is adapted for hummingbird pollination but no pollination records are known.

***Begonia*** sect. ***Casparya*** (Klotzsch) Warb.

*Naturlichen Pflanzenfamilien* 3(6a): 146 (Warburg 1894). – *Casparya* Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854). – *Begonia* subg. *Casparya* (Klotzsch) C.B.Clarke, *Botanical Journal of the Linnean Society* 18: 116 (Clarke 1881). – **Type**: lectotype: *Casparya coccinea* Klotzsch = *Begonia urticae* L.f., designated by Doorenbos *et al.* (1998: 80).

### Type material

Based on *Casparya* Klotzsch.

### Synonymy notes

For a full list of sectional synonyms, see Moonlight *et al.* (2018) and Jara-Muñoz *et al.* (2019).

### Notes

This is one of the most easily recognisable sections of *Begonia* in the Americas, comprising caulescent species with highly distinctive 3-horned fruits that dehisce dorsally rather than laterally as in most begonias. This character was also shared with *B.* sect. *Semibegoniella* (C.DC.) F.A.Barkley & Baranov, whose species differed in their fused tepals, but this section was recently brought into synonymy with *B.* sect. *Casparya* based upon evidence from molecular phylogenies (Jara-Muñoz *et al.* 2019). *Begonia* sect. *Casparya* is most diverse in the northern Andes of Ecuador and Colombia. We recognise three species from Peru including one new species and two endemics.

6. ***Begonia condorensis*** Jara & Moonlight sp. nov.
urn:lsid:ipni.org:names:77323287-1
Figs 20, 21A

### Diagnosis

*Begonia condorensis* sp. nov. is most similar to *B. valvata* L.B.Sm. & B.G.Schub. but differs in its number of stamens (4–6 vs 4); the apices of the tepals of the staminate flowers (rounded to truncate vs retuse); the shape of its leaf laminae (lanceolate to oblanceolate vs oblong); and the indumentum on the underside of the leaves (sparsely pilose vs densely villous).

### Etymology

*Begonia condorensis* sp. nov. is endemic to the Cordillera del Cóndor, which spans the borders of Peru and Ecuador. It is named for this mountain range.

### Type

PERU – **Cajamarca Region: Prov. San Ignacio** • Dist. Huarango, Cordillera Huarango (prolongación al sur de la Cordillera del Cóndor), Sector El Romerillo; 5°16′17″ S, 78°40′13″ W; 2060 m a.s.l.; 24 Apr. 2006; *E. Rodríguez, S. Orroyo, J. Nuñez & L. Campos 2996*; holotype: HUT [HUT44721]; isotypes: HUT [HUT44721], MO [MO-2194463], US [US00951218], QCNE [QCNE0220802].

### Specimens examined

ECUADOR – **Prov. Santiago-Zamora** • Dist. Palanda, Región de la Cordillera del Cóndor, sector Sur, Parroquia San Francisco de Vergel, Margen izqueirdo del río Vergel, pantano; 4°43′01″ S, 78°57′47″ W; 1800 m a.s.l.; 13 Mar. 2005; *W. Quizhpe, B. Medina, C. Aguirre & M. Prado 1013*; HUT [HUT45696], MO [MO-2135430].

PERU – **Cajamarca Region: Prov. San Ignacio** • Dist. Huarango, Nuevo Mundo, Caserío Pisaguas, a 2 horas del poblado y al norte, margen derecha quebrada Santa Rosa; 5°10′ S, 78°32′ W; 1700 m a.s.l.; *E. Rodríguez R. 1900*; HUT, MO [MO-1100939], US [US00843967] • Dist. Huarango, Cordillera Huarango (El Romerillo), Base cordillera en el lado oriental; 5°16′17.1″ S, 78°40′13.5″ W; 2062 m a.s.l.; *S. Arroyo A. & E. Rodríguez R. 171*; HUT.

### Description

Caulescent herb, to 50 cm high. *Stem* erect, branching; internodes to 5.5 cm long, to 3 mm thick, succulent, green, sparsely to densely pilose. *Stipules* deciduous, lanceolate to elliptic, 5–20 × 1–5 mm, apex acute, mucronate, translucent, brown, glabrous, margin entire, aciliate. *Leaves* 5–10 per stem, alternate, basifixed; petiole 0.2–1.5 cm long, green, sparsely to densely villous; blade subsymmetric, lanceolate to oblanceolate, to 13 × 4.5 cm, membranaceous, apex acuminate, base dimidiate, the largest side rounded, the narrow side cuneate and up to 5 mm further along the petiole, margin serrate, ciliate, upper surface green, sparsely pilose, lower surface green, glabrous to sparsely pilose, sparsely pilose on the veins, veins pinnate, with 6–10 secondary veins on the larger side, 5–7 secondary veins on the smaller side. *Inflorescences* 1 per stem, bisexual, axillary, erect, cymose, with 4 branches, bearing up to 4 staminate flowers and 1 pistillate flower, protandrous; peduncle to 3.5 cm long, sparsely villous, bracts deciduous, elliptic to ovate, 3–10 × 1–4 mm, translucent, red to orange, glabrous, apex rounded, margin entire to serrate at the apex, aciliate to ciliate at the apex. *Staminate flowers*: pedicels to 17 mm long, densely villous; tepals 4, projecting, outer 2 ovate, 8–13 × 4–10 mm, apex rounded to truncate, orange to red, glabrous, margin entire, aciliate, inner 2 elliptic, 7–17 × 3–6 mm, apex acute to truncate, orange to red, glabrous, margin entire, aciliate; stamens 4–6, projecting, white, filaments 2–4 mm long, free, anthers ellipsoid, ca 3 × 0.5 mm, dehiscing via lateral slits, connectives extended to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 8 mm long; bracteoles lacking; tepals 5, subequal, persistence unknown, projecting, the largest ovate, 9–17 × 4–10 mm, apex acute rounded, orange to red, glabrous, margin entire, aciliate, the smallest elliptic to ovate, 9–14 × 1.5–5 mm, apex acute to rounded, orange to red, glabrous, margin entire, aciliate; ovary body obdeltoid, 3–5 × 4–6 mm, orange to red, sparsely villous, equally 3-winged, wings horn-shaped, ca 2 × 8 mm; 3-locular, placentae unknown; styles 3, orange to red, fused at the base, 7–8 mm long, irregularly 5 times divided, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* unknown. *Fruit* unknown.

### Proposed conservation assessment

Known from three localities in the Cordillera del Cóndor and with an EOO of 720 km$^2$. The Cordillera is partially deforested on its Western flank in Peru and Ecuador, but extensive forest remains elsewhere. It is likely that *B. condorensis* sp. nov. is found in much of this habitat. We were unable to locate the species at its type locality during fieldwork in 2016 but this is likely because it is common only in

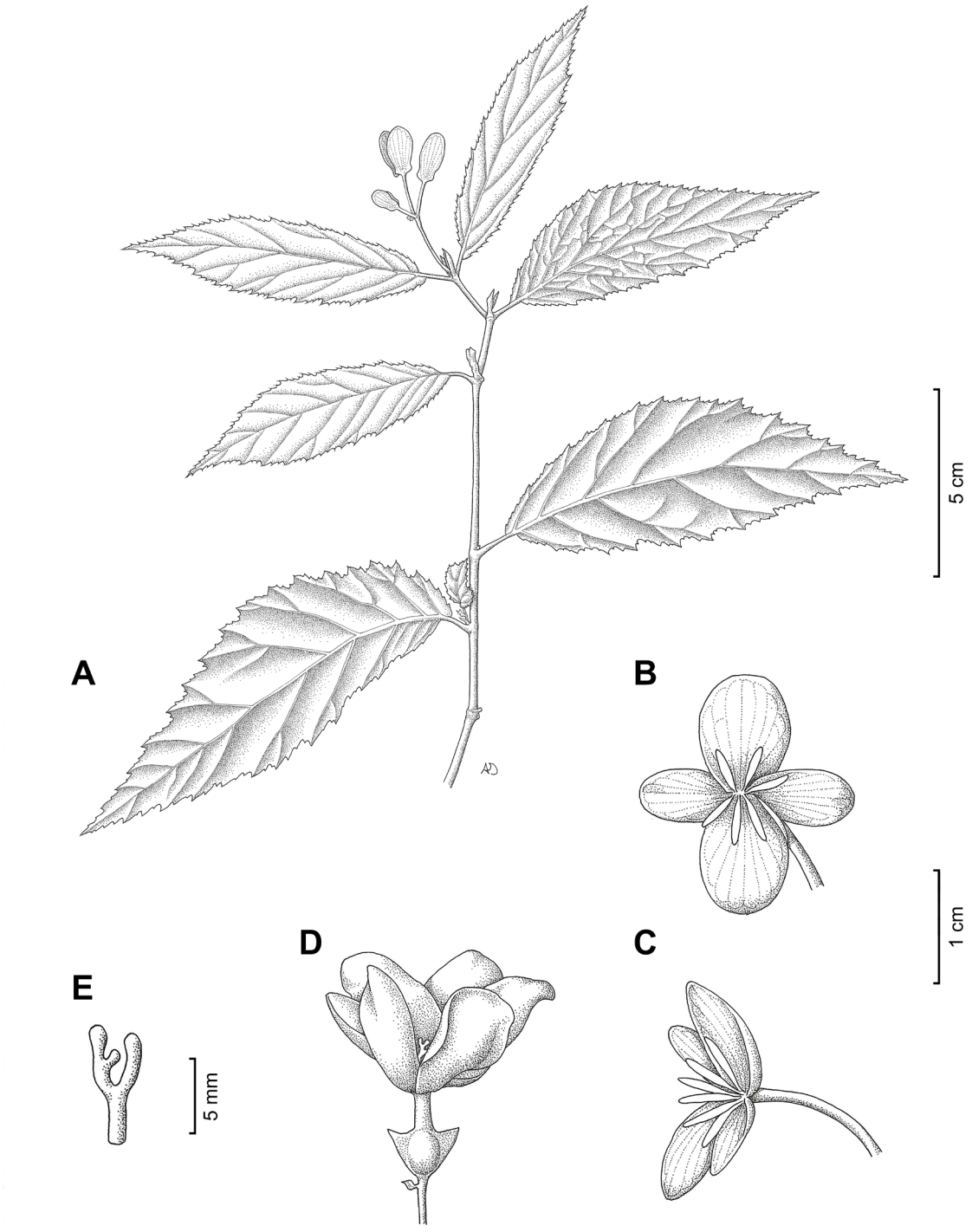


**Fig. 20.** *Begonia condorensis* Jara & Moonlight sp. nov. **A**. Habit. **B**. Staminate flower, front view. **C**. Staminate flower, side. **D**. Pistillate flower, front view. **E**. Style and stigma. Illustration by Anna Dorward from *E. Rodríguez 2996* (US).

specific microhabitats. Given its small range, few known localities, and the deforestation on the west of the Cordillera del Cóndor, we assess *B. condorensis* sp. nov. as Vulnerable (VU B2ab(iii)).

### Identification notes

Within Peru, *B. condorensis* sp. nov. is the only species with pinnately veined leaves and < 10 stamens. It superficially resembles *B. urticae*, especially relatively glabrous individuals with relatively membranaceous leaves, *B. urticae* differs in its much smaller staminate (up to 8 mm long vs up to 17 mm long) and pistillate tepals (up to 6 mm long versus up to 17 mm long).

### Notes

The fruits of *B. condorensis* sp. nov. remain unknown. A single duplicate of the specimen *E. Rodríguez R. 1900* (MO [MO-1100939]) has a relatively mature pistillate flower with a well-developed ovary. This suggests that the fruit is similar to that of *B. valvata*, which is a large, three-horned capsule with a large apical column. In contrast to the fruits of *B. valvata*, the horns of *B. condorensis* sp. nov. are most likely projecting rather than reflexed.

### Distribution and ecology

Known from Ecuador and Peru and collected in the Ecuadorian Province of Santiago-Zamora and the border of Cajamarca and Amazonas Regions in Peru (Fig. 21A). Found within lower and middle montane forest at an elevation of 1700–2062 m a.s.l. Like other species in *B.* sect. *Casparya*, *B. condorensis* sp. nov. is found in shaded humid microhabitats, including around waterfalls, and its horned fruits appear adapted for dispersal by water drops.

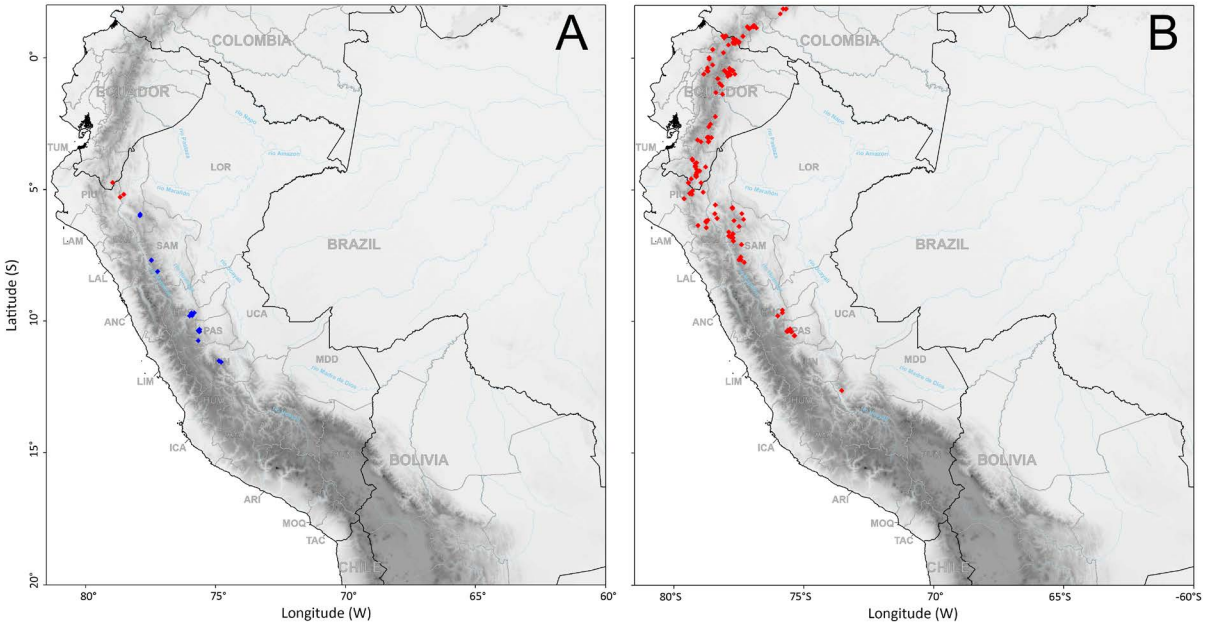


**Fig. 21.** Distribution of *Begonia* sect. *Casparya* (Klotzsch) Warb. in Peru and surrounding countries. **A**. *B. condorensis* Jara & Moonlight sp. nov. (red) and *B. hirta* (Klotzsch) L.B.Sm. & B.G.Schub. (blue). **B**. *B. urticae* L.f. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

7. ***Begonia hirta*** (Klotzsch) L.B.Sm. & B.G.Schub.
Figs 21A, 22

*Publications of the Field Museum of Natural History, Botanical Series* 13 (4/1): 197 (Smith & Schubert 1941a). – *Casparya hirta* Klotzsch, *Gattungen und Arten* 1854: 247 (Klotzsch 1855). – *Casparya cordifolia* var. *hirta* (Klotzsch) A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 273 (de Candolle 1864).

– **Type**: PERU – **[Huánuco Region: Prov. Huánuco]** • in Muña; [9°40′ S, 75°49′ W]; 1784, *H. Ruiz s.n.*; lectotype: B [B101068571, F neg. 20854], **designated here**.

Walpers (1858: 934); Smith & Schubert (1941a: 192); Brako & Zarucchi (1993: 193); León & Monsalve (2006: 166).

*Casparya columnaris* Klotzsch, *Gattungen und Arten* 1854: 247 (Klotzsch 1855). – **Type**: PERU – **[Huánuco Region: Prov. Huánuco]** • in Muña; [9°40′ S, 75°49′ W]; *H. Ruiz s.n.*; lectotype: B [F neg. 20853], **designated here**; isolectotype: HAL ex B [HAL0121732].

de Candolle (1864: 274); Smith & Schubert (1941a: 192).

*Casparya grewiifolia* var. *pavoniana* A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 272 (de Candolle 1864). – **Type**: [Peru]; 1777–1788; *J.A. s.n.*; lectotype: G-BOIS ex B ex herb. Lamberti, **designated here**. **Syn. nov.**

Smith & Wasshausen (1979: 242).

*Casparya cordifolia* A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 273 (de Candolle 1864). – *Begonia cordifolia* (A.DC.) Warb., nom. illeg.; later homonym non (Wight) Thwaites), *Naturlichen Pflanzenfamilien* 3 (6A): 146 (Warburg 1894). – *Begonia hirta* var. *cordifolia* (A.DC.) L.B.Sm. & B.G. Schub., *Publications of the Field Museum of Natural History, Botanical Series* 13 (4/1): 192 (Smith & Schubert 1941a). – **Type**: PERU • *J.A. Pavón s.n.*; lectotype: G-BOIS, **designated here** • *J.A. Pavón s.n.*; syntype: G-DC ex G-BOIS [F neg. 7315] • *H. Ruiz L. s.n.*; 1777–1788; syntype: B [F neg. 20853] • *H. Ruiz L. s.n.*; 1777–1788; syntype: HAL ex B ex herb. Lamberti [HAL0121732] • *H. Ruiz L. s.n.*; 1777–1788; syntype: B [F neg. 20854]. **Syn. nov.**

Walpers (1858: 875); Smith & Schubert (1941a: 192); Brako & Zarucchi (1993: 193); Vásquez *et al.* (2005: 112–125).

*Begonia raimondii* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74 (4): 629 (Irmscher 1949). – **Type**: PERU – **Junín Region: Prov. Jauja** • Valle del río Masamerich, entre Costambos Atac y Calabaza; [11°32′ S, 74°48′ W]; 3100 m a.s.l.; 23 Apr. 1913; *A. Weberbauer 6639*; lectotype: US [US00115437], **designated here**; isolectotypes: B, MOL [MOL00003002, MOL0003003, MOL0003004], US [US00222277]) • Junín Region: Entre Santiago y Llalla; *A. Raimondi 2982*; syntype: B [n.v.].

Brako & Zarucchi (1993: 194); León & Monsalve (2006: 168); Jara-Muñoz *et al.* (2019: 63).

*Begonia columnaris* Ruiz ex Klotzsch (nom. inval.; nom. rej. pro syn. *Casparya columnaris* Klotzsch (nom. inval.; nom. nud.)), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854).

*Casparya columnaris* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854).

*Casparya hirta* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854).

*Begonia coccinea* Pav. ex A.DC. (nom. inval.; nom. rej. pro syn. *Casparya cordifolia* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabili* 15 (1): 273 (de Candolle 1864).

*Begonia columnaris* Pav. ex A.DC. (nom. inval.; nom. rej. pro syn. *Casparya cordifolia* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabili* 15 (1): 273 (de Candolle 1864).

*Begonia incarnata* Pav. ex A.DC. (nom. inval.; nom. rej. pro syn. *Casparya cordifolia* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabili* 15 (1): 273 (de Candolle 1864).

*Begonia hirsuta* Pav. ex A.DC. (nom. inval.; nom. rej. pro syn. *Casparya cordifolia* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabili* 15 (1): 273 (de Candolle 1864).

*Begonia rosea* Pav. ex A.DC. (nom. inval.; nom. rej. pro syn. *Casparya cordifolia* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabili* 15 (1): 273 (de Candolle 1864).

**Etymology**

The epithet derives from the Latin word '*hirtus*', meaning 'hairy', and refers to the indumentum of the species.

**Selected specimens examined**

PERU • *J.A. Pavón 322*; G • ibid.; *J.A. Pavón s.n.*; G-BOIS [2], OXF • ibid.; *H. Ruiz & J.A. Pavón s.n.*; 1778–1788; MA [MA813506] • ibid.; 1778–1788; *H. Ruiz & J.A. Pavón s.n.*; MA [MA813498]. – **San Martín Region: Prov. Mariscal Cáceres** • entre Puerta de Monte y Playa Colorado, Parque Nacional río Abiseo; [7°40′ S, 77°28′ W]; 3050–3350 m a.s.l.; 30 Jul. 2000; *J. Roque, K. Young, A. Cano & B. León 1667*; USM. – **La Libertad Region: Prov. Pataz** • Dist. Buldibuyo, La Montañita; 8°06′ S, 77°14′ W; 3000 m a.s.l.; 15 Mar. 2001; *A. Sagástegui A., M. Zapata & G. Palacios 16316*; F [V0410368F], US [US00673155]. – **Huánuco Region: Prov. Huánuco** • Pillao; [9°47′ S, 76°00′ W]; 2700 m a.s.l.; 27 Feb. 1946; *F. Woytkowski 34160*; G, MO [MO-2264387], US [US00222361] • Chinchao, Caserío de Huanacaure, sendero terminal Vista Alegre Huanchac; [9°46′ S, 75°54′ W]; 14 Oct. 2011; *W. Mendoza, D. Sasaki & D. Trujillo 6314*; USM • in Muña; [9°40′ S, 75°49′ W]; *J.A. Pavón s.n.*; G-BOIS. – **Pasco Region: Prov. Oxapampa** • Dist. Huancabamba, Oso Playa; 10°17′58″ S, 75°36′36″ W; 2300 m a.s.l.; 18 Oct. 2009; *L. Valenzuela, A. Monteagudo, M. Cueva, A. Peña, J. Mateo & R. Rivera 13646*; HOXA, MO [MO-2240414] • Dist. Huancabamba, Localidad de Lanturachi, sector Santa Bárbara, alrededor del campamento en Milpo; 10°23′ S, 75°37′ W; 2862 m a.s.l.; 20 Oct. 2003; *J. Perea, R. Francis, C. Mateo & G. Ortiz 813*; COL, HOXA, F, MO [MO-1102976], NY, US [US00843959] • Oxapampa–Cerro de Pasco Road, 20–30 km W of Oxapampa; 10°40′ S, 75°55′ W; 2000–2500 m a.s.l.; 3 Feb. 1983; *A.H. Gentry, D. Smith, R. Vasquiez & B. León 40026*; MO [MO-2180427], US [US00672861]. – **Junín Region** • Concepcion to Satipo, km 140; [74°52′ S, 11°29′ W]; 22 Jan. 1946; *R.J. Seibert 2385*; MO [MO-2264408], US [2: US00424984, US00222153].

**Description**

Caulescent herb, to 50 cm high. *Stem* erect, rarely branching; internodes to 9 cm long, to 6 mm thick, succulent, pale green to red, hispid. *Stipules* deciduous, triangular, 6–15 × 3–10 mm, apex acute, translucent, pale green, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 1–2.5 cm long, red, hispid; blade asymmetrical, lanceolate, to 13 × 5 cm, membranceous, apex attenuate, base dimidiate, the larger side rounded, the narrow side cuneate, margin serrate, ciliate, upper surface green, the veins red, glabrous, lower surface pale green, sparsely villous on the main vain, pilose on the lamina, veins pinnate, with 6–8 secondary veins on the larger side, 4–6 secondary veins on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with up to 16 branches, bearing up to 8 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 8 cm long, red, sparsely villous, bracts deciduous, elliptic to ovate, 8–15 × 3–5 mm, translucent, white flushed red, glabrous, apex rounded, margin entire, aciliate. *Staminate flowers*: pedicels to 25 mm long, glabrous; tepals 4, spreading, outer 2 ovate, 25–35 × 10–15 mm, apex obtuse, scarlet, glabrous, margin entire, aciliate, inner 2 ovate, ca 20 × ca 8 mm, apex obtuse, scarlet, glabrous, margin entire, aciliate; stamens 12–18, projecting, pale yellow, filaments 2–4 mm long, free, anthers linear, 5–6 × 0.5 mm long, dehiscing via lateral slits, connectives extended to 0.5 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 10 mm long; bracteoles lacking; tepals 5, subequal, deciduous in fruit, spreading, elliptic, 12–15 × 3–8 mm, apex obtuse, scarlet,

glabrous, margin entire, aciliate; ovary body ovoid, ca 4 × 2.5 mm, green, flushed red at the apex of the wings, glabrous, equally 3-winged, wings horn-shaped, ascending, ca 4 × 7 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, pink, free, 6–10 mm long, 4–6 times divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 15 mm long. *Fruit body* ovoid, to 6 × 6 mm, drying light brown, wings same shape as in ovary, expanding to 12 × 15 mm, column at the apex of the ovary elongating to 15 mm.

**Proposed conservation assessment**

Previously assessed as Data Deficient (DD) by León & Monsalve (2006). Endemic to upper montane forests, which are highly threatened, but with an EOO of > 25 000 km$^2$ and a range that includes several national parks and areas of remote primary forest. We assess *B. hirta* as least concern (LC), which replaces the existing DD assessment of *B. raimondii* Irmsch. (León & Monsalve 2006).

**Synonymy notes**

Previous authors have included *Casparya grewiifolia* var. *pavoniana* A.DC. as a synonym of *B. longirostris* Benth. This is likely because both *C. grewiifolia* A.DC. and *C. grewiifolia* var. *jamesoniana* A.DC. are both synonyms of *B. longirostris* (Smith & Wasshausen 1979). However, *B. longirostris* is not found in Peru and the type specimen of *C. grewiifolia* var. *pavoniana* was collected in Peru by J.A. Pavón. This material has the horned fruits characteristic of members of *B.* sect. *Casparya* but unlike *B. longirostris* has staminate flowers with free tepals. In all respects, this material falls within our circumscription of *B. hirta*. This includes the transversely ovate leaf blades and relatively large staminate flowers with red, projecting tepals We therefore transfer *C. grewiifolia* var. *pavoniana* into the synonymy of *B. hirta*.

**Typification notes**

Jara-Muñoz *et al.* (2019) attempted to lectotypify *C. hirta* Klotzsch and its homonyms based upon a photograph of *H. Ruiz s.n.* in Berlin (B101068571) housed in F (F neg. 20854). The International Code of Botanical Nomenclature does not allow the designation of a photograph as a lectotype (Turland *et al.* 2018: Article 9.3). The authors chose a photograph as a lectotype as they believed the specimen housed in B was destroyed in WWII. Berlin's *Begonia* collections escaped destruction as they were at that time on loan to Edgar Irmscher. The sheet of *H. Ruiz s.n.* cited by Irmscher in the protologue for *C. hirta* still exists in Berlin herbarium (B101068571), thus we designate this as the lectotype of *C. hirta* herein.

The protologue of *C. columnaris* Klotzsch cited material collected by H. Ruiz & J.A. Pavón in Muña and identified as *B. columnaris* (Klotzsch 1855: 247). We know of two sheets that match this description, one in Berlin herbarium (F neg. 20853) and a second in the herbarium of the University of Halle but formerly of Berlin (HAL0121732). We designate the specimen in Berlin as the lectotype of *C. columnaris*.

Alphonse Pyramus de Candolle cited material collected by J.A. Pavón and deposited in G-BOIS in the protologue of *C. grewiifolia* var. *pavoniana* (de Candolle 1864: 272). There are two sheets filed under this name in G-BOIS, which may be syntypes. The first of these states it was collected by H. Ruiz rather than J.A. Pavón and was formerly in Lambert's herbarium and then Berlin herbarium. This sheet does however have a determination slip written by de Candolle, demonstrating he considered this sheet part to be this taxon. The second sheet has two plants on it, each with a slip that just says "herb. Pavón" in Pavón's handwriting. This sheet is likely one bought by de Candolle directly from the Pavón herbarium. We designate the first sheet as the lectotype of *C. grewiifolia* var. *pavoniana* because of the determination slip.

The protologue of *C. cordifolia* A.DC. cites several sheets collected by H. Ruiz and J.A. Pavón in Peru (de Candolle 1864: 273), which are all syntypes. De Candolle also cited *C. columnaris* Klotzsch nom. nud. in synonymy, but as he cited Klotzsch's 1854 nom. nud. rather than his 1855 legitimate name,


**Fig. 22.** *Begonia hirta* (Klotzsch) L.B.Sm. & B.G.Schub., habit. **a**. Staminate flower, front view. **b**. Pistillate flower, front/side view. Illustration by Franco Pulgar from material collected by H. Ruiz & J.A. Pavón during their Peruvian expedition. Reproduced with the permission of MA herbarium (MA-AJB04-D-1394), where it is filed as *Begonia hirsuta*.

*C. cordifolia* may still be a superfluous name. The specimens cited by de Candolle are as follows: (i) specimens collected near Muña and deposited in G-BOIS and Berlin herbarium. This includes the sheets discussed in ii and iii, a sheet in Berlin (F neg. 20584), and a sheet in G-DC herbarium that was taken from G-BOIS (F neg. 7315); (ii) specimens in Berlin herbarium identified as *B. columnaris*. This includes a sheet in B (F neg. 20853) was collected near Muña that we have designated as the lectotype of *C. columnaris*, and a sheet in HAL but that used to be in Berlin, that we treat as an isolectotype of *C. columnaris* (HAL0121732); (iii) specimens identified as *B. hirsuta* Pav. ex A.DC., *B. columnaris* Pav. ex A.DC., *B. incarnata* Pav. ex A.DC., *B. rosea* Pav. ex A.DC., or *B. coccinea* Pav. ex A.DC. in G-BOIS. This citation refers to a single sheet from Pavón's personal herbarium that includes all five of these names and was also collected near Muña. We designate the specimen discussed in iii as the lectotype of *C. cordifolia* and its homonyms, because this citation is completely unambiguous and refers to a high-quality specimen. We note that de Candolle cited all the syntypes of *C. columnaris* that we know of, so it would be reasonable to consider *C. cordifolia* a superfluous name (Turland *et al.* 2018: Article 52.2). However, de Candolle cited specific herbaria whereas Klotzsch cited gatherings with no herbarium citations. If there are further duplicates in other herbaria, these would have been syntypes at the time of publication (Turland *et al.* 2018: Article 9.6) so de Candolle would not have cited all syntypes. We therefore treat *C. cordifolia* as a legitimate name.

Jara-Muñoz *et al.* (2019) synonymised *B. raimondii* with *B. hirta* and attempted to designate a lectotype in the process. Irmscher cited two collections in the protologue of *B. raimondii*: *A. Weberbauer 6639* (B, US) and *A. Raimondi 2982* (B; Irmscher 1949: 629). Jara *et al.* cited a *A. Weberbauer 6639* as the "(holotype: US here designated)". It is not possible to designate a holotype after a name is published and since 2001 a lectotypification has not been affected unless the word "lectotypus" or equivalent is used (Turland *et al.* 2018: Article 9.23). We agree with Jara *et al.* that the most suitable material for lectotypification is in the US herbarium and select the sheet US00115437 as the lectotype.

H. Ruiz and J.A. Pavón collected several specimens of *B. hirta* including the type and it appears from three unpublished illustration of this species housed in Madrid (MA-AJB04-D-1394, Fig. 22; MA-AJB04-D-1403; MA-AJB04-D-1399) that they intended to publish at least some of this material as *B. incarnata*, *B. hirsuta* or *B. cucullata*. Ruiz and Pavón never completed an account of the Begoniaceae for their *Flora Peruviana et Chilensis* so these remain unpublished names.

**Identification notes**

*Begonia hirta* is best recognised as the Peruvian member of *B.* sect. *Casparya* with the largest tepals; for example, its staminate tepals are at least 20 mm long whereas those of other species reach only 15 mm long. *Begonia urticae* is the only other Peruvian member of the section that sometimes has red flowers, but this species differs in its much smaller flowers with spreading rather than projecting tepals.

**Distribution and ecology**

Endemic to Peru and known from collections made in San Martín, La Libertad, Huánuco, Pasco, Junín Regions (Fig. 21A). Found in middle and upper montane forest at an elevation of 2000–3300 m a.s.l. *Begonia hirta* has also been identified from photographs taken at Catarata Yumbilla (5°55′09″ S, 77°54′08″ W; [2500 m a.s.l.]) and above Catarata Gocta (5°05′53″ S, 77°05′29″ W; 2730 m a.s.l.) in Amazonas Region by Wenbo Chen and Josh Allen respectively.

8. ***Begonia urticae*** L.f.
Figs 21B, 23

*Supplementum Plantarum Systematis vegetabilium*: 420 (Linnaeus 1781). – *Sassea urticae* (L.f.) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 128 (Klotzsch 1854). – *Casparya urticae* (L.f.) A.DC, *Prodromus Systematis Naturalis Regni Vegetabilis* 15(1): 274 (de Candolle 1864). – **Type**: COUNTRY UNKNOWN • Locality unknown; *J. Mutis s.n.*; lectotype: LINN [LINN1125.3], **designated here**; possible isolectotype: MA [MA660695].

Smith (1790: t. 45) [as 'urticaefolia']; de Candolle (1864: 274); Walpers (1858: 938); Smith & Schubert (1946a: 33, 1952: 36, 1958: 61); Smith (1973: 212); Smith & Wasshausen (1979: 242, 1986: 29, 1989: 18); Vásquez *et al.* (2005: 112–125); Burt-Utley (2015: 90).

*Begonia columnaris* Benth., *Plantas Hartwegianas Imprimis Mexicanas*: 131 (Bentham 1845). = *Sassea columnaris* (Benth.) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 128 (Klotzsch 1854). = *Casparya columnaris* (Benth.) A.DC. (nom. illeg.; later homonym non Klotzsch), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 274 (de Candolle 1864). = *Begonia columnaris* var. *glabra* (Klotzsch) L.B.Sm. & B.G.Schub., *Publications of the Field Museum of Natural History, Botanical Series* 13: 187 (Smith & Schubert 1941a). – **Type**: ECUADOR • Mountains of Loxa [Loja]; *K.T. Hartweg 740*; lectotype: K [K000536702], **designated here**; isolectotypes: LD [LD1404657], K, OXF.

de Candolle (1864: 274); Walpers (1858: 938); Smith & Schubert (1946a: 33).

*Begonia trachyptera* Benth., *Plantas Hartwegianas Imprimis Mexicanas*: 184 (Bentham 1845). = *Stiradotheca trachyptera* (Benth.) Klotzsch orth. var., *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotsch 1854). = *Stibadotheca trachyptera* (Benth.) Klotzsch, *Gattungen und Arten* 1854: 251 (Klotzsch 1855). = *Casparya trachyptera* (Benth.) A.DC., *Prodromus Systematis Naturalis Regni Vegetabili* 15 (1): 274 (de Candolle 1864). – **Type**: COLOMBIA – **[Prov. Cauca]** • In sylvis juxta Pitayo, Prov. Popayán; [2°45′ N, 76°18′ W]; 3200 m a.s.l.; 1843; *K.T. Hartweg 1023*; lectotype: K [K000536703], **designated here**; isolectotypes: K, LD [LD1418113].

Smith & Schubert (1946a: 33).

*Casparya coccinea* Klotzsch, *Gattungen und Arten* 1854: 248 (Klotzsch 1855). – **Type**: PERU – **[Huánuco Region: Prov. Huánuco]** • in Muña [9°40′ S, 75°49′ W]; *H. Ruiz & J.A. Pavón s.n.*; lectotype: B [F neg. 20855], **designated here**.

de Candolle (1864: 274); Walpers (1858: 935); Smith & Schubert (1941a: 187; 1946a: 33).

*Sassea glabra* Klotzsch, *Gattungen und Arten* 1854: 254 (Klotzsch 1855). = *Casparya columnaris* var. *glabra* (Klotzsch) A.DC., *Prodromus Systematis Naturalis Regni Vegetabili* 15 (1): 274 (de Candolle 1864). – **Type**: PERU • 1777–1788; *H. Ruiz s.n.*; lectotype: HAL ex B ex herb. Lamberti [HAL0121733], **designated here**.

de Candolle (1864: 274); Walpers (1858: 939); Smith & Schubert (1941a: 187, 1946a: 33); Smith & Wasshausen (1989: 18).

*Casparya urticae* var. *hispida* A.DC., *Prodromus Systematis Naturalis Regni Vegetabili* 15 (1): 274 (de Candolle 1864). – **Type**: COSTA RICA • Prope Aguacate; 1857; *K. Hoffmann 736*; lectotype: B [B100243045, F neg. 20856], **designated here**; COLOMBIA • In montibus ad orient Botogae; *I.F. Holton 723*; syntype: G-DC; isosyntypes: G-BOIS, K [K000536700], NY • In montibus juxta Botatam; Oct. 1852; *I.F. Holton 727*; syntype: K [K000536699]; isosyntypes: G-BOIS, G-DC, NY.

Standley (1937: 747); Smith & Schubert (1946a: 34).

*Begonia monticola* C.DC., *Bulletin de L'Herbier Boissier* II 8 (5): 325 (de Candolle 1908). – **Type**: ECUADOR • Montibus Pichincha et Corazon; *A. Sodiro 584*; lectotype: G [F neg. 24195],

**designated here**; isolectotype: G • In silva subandina et subtropica, m. Pichincha et Corazon; *A. Sodiro 592*; syntype: Smith & Schubert (1946a: 34).

*Begonia torresii* Standl., *Journal of the Washington Academy of Sciences* 17: 313 (Standley 1927). – **Type**: COSTA RICA – **Prov. San José** • Las Nubes; [9°59′ N, 83°58′ W]; 21 Mar. 1924; *P.C. Standley 38561*; holotype: US [US00115472].

Smith & Schubert (1946a: 34).

*Begonia chiriquensis* Standl., *Annals of the Missouri Botanical Garden* 27: 321 (Standley 1940). – **Type**: PANAMA – **Prov. Chiriqui** • trail from Cerro Punta to headwaters of río Caldera; [8°50′ N, 82°30′ W]; 2250–2500 m a.s.l.; 14 Jan. 1939; *P.H. Allen 1435*; holotype: F [V0077648F]; isotypes: GH [GH00068149], MO [MO-510547], NY [NY00112265].

Smith & Schubert (1946a: 33).

*Begonia urticae* var. *retusa* L.B.Sm. & B.G.Schub., *Caldasia* 4: 37 (Smith & Schubert 1946a). – **Type**: COLOMBIA – **Valle Department** • Cordillera occidental, Los Farallones, filo de la cordillera, extremo N en el cerro Alto del Buey; [3°22′ N, 76°42′ W]; 3500–3600 m a.s.l.; 11 Oct. 1944; *J. Cuatrecascas 17942*; holotype: GH [GH00068296]; isotypes: COL [2: COL000003009, COL000003010], F [V0077669F], P [P01900836], US [US00169383, US00115488].

Smith & Wasshausen (1989: 18).

*Begonia glabra* Ruiz ex Klotzsch (nom. inval.; nom. rej. pro syn. *Sassea glabra* Klotzsch (nom. inval.; nom. nud.)), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854).

*Sassea glabra* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854).

*Casparya coccinea* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854).

*Begonia cucullata* Ruiz ex Klotzsch (nom. inval.; nom. rej. pro syn. *Sassea glabra* Klotzsch), *Gattungen und Arten*: 1854: 254 (Klotzsch 1855).

*Begonia columnaris* Pav. ex A.DC. (nom. inval.; nom. rej. pro syn. *Casparya columnaris* var. *glabra* (Klotzsch) A.DC.), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 274 (de Candolle 1864).

*Stibadotheca urticae* Klotzsch ex A.DC. (nom. inval.; nom. rej. pro syn. *Casparya trachyptera* (Benth.) A.DC.), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 274 (de Candolle 1864).

*Sassea hoffmanniana* Klotzsch ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia urticae* var. *hispida* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 275 (de Candolle 1864).

*Begonia longirostris* auct. non Benth.: Brako & Zarucchi, *Monographs in Systematic Botany from the Missouri Botanical Garden*, 45: 193 (Brako & Zarucchi 1993).

### Etymology

Named for the superficial resemblance of the species' leaves to those of stinging nettles (*Urtica* L., Urticaceae).

### Selected specimens examined

PERU • *J.A. Pavón s.n.*; G, G-BOIS [2], OXF. – **Amazonas Region: Prov. Bongará** • Cordillera Colán SE of La Peca; [5°34′ S, 78°24′ W]; 2280–2410 m a.s.l.; 30 Sep. 1978; *P.J. Barbour 3701*; MO [MO-2180412], US [US00222330] • Dist. Yambrasbamba, Área de Conservación Privada Abra Patricia-Alto Nieva, Abra Patricia; 5°42'39.58–54.99"S, 77°48'30.96–27.60"W; 2658 m a.s.l.; 18 Jul. 2014; *Y.F. Deng et al. 1487*; USM. – **Prov. Bagua** • Bosque Berlín, reserva privada cerca Santa Clara; 5°54′08″ S, 78°24′55″ W; 2064 m a.s.l.; 6 Jul. 2018; *P.W. Moonlight 1276*; USM. – **Prov. Luya** •

Dist. Camporedondo, Tullanya, Pascana, La Palma; 6°04′35″ S, 78°21′45″ W; 2710 m a.s.l.; 7 Dec. 1996; *R. Vásquez & R. Rojas 21967*; MO [MO-2078375], USM • Camporrendo, Tullanga, subiendo del campamento o Paseana "La Pampa", hacia el Cerro Condorpuna; [6°36′ S, 77°53′ W]; 2700–3000 m a.s.l.; 7 Sep. 1989; *C. Díaz & J. Campos 3831*; MO [MO-1643487], USM. – **Prov. Rodríguez de Mendoza** • Dist. Vista Alegre, La Fortaleza camino a las construcciones Chachapoyas; 6°07′10.4–06′56″ S, 77°18′46.4–19.34″ W; 2020–2393 m a.s.l.; 22 May 2008; *V. Quipuscoa S., L. Cáceres M., I. Treviño Z. & J. Estela R. 3943*; HUT. – **Prov. Chachapoyas** • South side of the Molinopampas-Diosan pass; [6°10′ S, 77°41′ W]; 2700–3100 m a.s.l.; 8 Aug. 1962; *J.J. Wurdack 1633*; US [US00222331], USM • Dist. Leymebamba, middle eastern Calla-Calla slopes, 3–5 km SE of km 422 Leymebamba-Balsas road; [6°45′ S, 77°53′ W]; 3000–3200 m a.s.l.; 22 Aug. 1962; *J.J. Wurdack 1758*; G [2], NY, P [P05586561], US [US00222329], USM • Dist. Leymebamba, río El Jardín; 6°56′44″ S, 77°41′54″ W; 3090 m a.s.l.; 30 Jun. 2009; *R.W. Bussmann, J. Gruhn, R. Wagster, J.E. Briones, O. Espinoza & W. Espinoza 15933*; HUT. – **Piura Region: Prov. Huancabamba** • Carmen de la Frontera, alturas de Nueva York; [5°02′ S, 79°17′ W]; 3160 m a.s.l.; 28 Jul. 2006; *A. Cano, W. Mendoza & N. Valencia 16825*; USM[3] • Cerro Chinguela, a 20 km de Zapalache; [5°08′ S, 79°23′ W]; 3100–3200 m a.s.l.; 24 Apr. 2006; *A. Cano, N. Valencia & I. Salinas 16488*; USM • El Batán (Chinguela-El Carmen); [5°06′ S, 79°21′ W]; 2200 m a.s.l.; 15 Sep. 1981; *A. Sagástegui A. 10233*; HUT, MO [MO-2180410], NY. – **Cajamarca Region: Prov. San Ignacio** • San José de Lourdes, Cerro Parco; 5°04′38″ S, 78°53′30″ W; 2250 m a.s.l.; 9 Nov. 2000; *R. Vásquez, J. Campos, G. Calatayud & M. Huamán 26606*; MO [MO-1835905], USM. – **Prov. Cutervo** • Dist. San Andrés de Cutervo, Parque Nacional de Cutervo, Saucedal pasando por Chorro Blanco; [6°09′ S, 78°41′ W]; 2250 m a.s.l.; 3 Aug. 1988; *C. Díaz & H. Osores 2954*; MO [MO-098014] • Parque Nacional de Cutervo, trail from Chorro Blanco to San Andrés; 6°10′ S, 78°45′ W; 2100–2200 m a.s.l.; 15 Sep. 1991; *A.H. Gentry, C. Díaz & R. Ortiz 74851*; MO [MO-098017], USM • Dist. San Andrés de Cutervo, El Pajonal, alrededores las grutas da los Guacharos; [6°14′ S, 78°45′ W]; 2500 m a.s.l.; *J. Cabanillas S. 60*; CPUN. – **Prov. Chota** • a 1 km de Paraguay (Querocota-La Granja); [6°21′ S, 79°04′ W]; 2250 m a.s.l.; 7 Aug. 1994; *S. Leiva G., P. Chuna & J. Cadle 1394*; MO [2: MO-1641563, MO-1641564], NY • Rejopampa, al O del Pueblo de Paccha; [6°26′ S, 78°45′ W]; 2600 m a.s.l.; 21 Jun. 1993; *I. Sánchez V. 6568*; CPUN. – **San Martín Region: Prov. Rioja** • Bosque Protección Alto Mayo, unnamed trail from Centro de Interpretación Venceremos (km 382.6) to km 381 on highway 5N, Cerretera Fernando Belaúnde Terry; 5°39′57″ S, 77°44′54″ W; 1700–1800 m a.s.l.; 5 Jun. 2010; *J.L. Clark, M. Chocce, L. Clavijo, M. Overstreet & J. Pérez 11847*; US [US001862879], USM • Bosque Protección Alto Mayo, Trocha Kovachi; 5°42′02″ S, 7°44′27″ W; 1707 m a.s.l.; 2 Feb. 2016; *P.W. Moonlight & A. Daza 154*; E [E00885556], MO, MOL • Dist. Nuevo Cajamarca, cerca poblado Miraflores, Bosque Protección Alto Mayo; 5°54′ S, 77°23′ W; 1420 m a.s.l.; 3 Nov. 1996; *I. Sánchez V. & M.O. Dillon 8479*; CPUN, F [V0086776F], US [US00673159]. – **Prov. Mariscal Cáceres** • Above Gran Pajaten ruins; 7°S, 77°W, 2950 m a.s.l.; 22 Jul. 1985; *K. Young 1250* (US [US00222175] • ibid.; 24 Jul. 1985; *K. Young 1292*; HUT • Above timberline Puerta del Monte; [7°39′ S, 77°29′ W]; 22 Nov. 1985; *K. Young 2094*; MOL, US [US00222326] • Puerta de Monte, Parque Nacional río Abiseo; 7°38′56.8″ S, 77°24′58.4″ W; 3140 m a.s.l.; 5 Aug. 2000; *A. Cano et al. 10840*; USM. – **Huánuco Region: Prov. Huánuco** • In Muña; [9°40′ S, 75°49′ W]; *J.A. Pavón s.n.*; G-DC ex G-BOIS); Cerros al este del río Huallaga, entre Muña y el tambo de las vacas; [9°34′ S, 75°49′ W]; 3100 m a.s.l.; 1 Jun. 1913; *A. Weberbauer 6723*; MOL [3], US [US00222044] • Muña; [ca 9°40′ S, 75°49′ W; 1785], *H. Ruiz & J.A. Pavón s.n.*; MA [2, MA813495, MA813496]. – **Pasco Region: Prov. Oxapampa** • Dist. Huancabamba, Parque Nacional Yanachaga-Chemillén, Sector Tunqui, camino hacia María Puñis; 10°16'31.26"S, 75°30'58.72"W; 1895 m a.s.l.; 18–21 Oct. 2008; *M. Cueva, A. Peña, R. Rivera & M. Moens 231*; HOXA, USM • Dist. Huancabamba, Parque Nacional Yanachaga-Chemillén, Abra Yanachaga; 10°22′46″ S, 75°27′43″ W; 2870–3200 m a.s.l.; 12 Jun. 2003; *R. Vásquez et al. 28129*; HOXA, MO [MO-1102451], US [US000843968] • Parque Nacional Yanachaga-Chemillén, Sector San Alberto, alrededores Refugio El Cedro; 10°32′43″ S, 75°21′30″ W; 2483 m a.s.l.; 26–27 Apr. 2009; *M. Cueva 621*; HOXA, USM. – **Cusco Region: Prov. La Convención** • In deep valley just below

Camp 5 and the land-slide; 12°37′ S, 73°32′ W; ca 2700 m a.s.l.; 7 Jul. 1968; *T.R. Dudley 10853*; US [US00222325].

### Description

Caulescent herb, to 50 cm high. *Stem* erect, branching; internodes to 4.5 cm long, to 2 mm thick, succulent, green to red, tomentose. *Stipules* late deciduous, lanceolate, 4–7 × 2–4 mm, apex obtuse, translucent, green, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 0.3–2 cm long, pale green to red, glabrous to tomentose; blade subsymmetric, lanceolate, to 8 × 3 cm, membranaceous, apex acuminate, base dimidiate, the large side rounded, the smaller side cuneate to rounded, margin undulate, serrulate, or irregularly serrate, ciliate, upper surface pale to dark green, glabrous to pilose, lower surface pale green to vivid red, glabrous throughout to glabrous and densely pilose on the major veins, veins pinnate, with 5–10 secondary veins on the larger side, 4–7 secondary veins on the smaller side. *Inflorescences* 1–5 per stem, bisexual, axillary, pendulous erect, cymose, with 2 branches, bearing up to 3 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 3 cm long, pale green to red, glabrous to tomentose, bracts deciduous, ovate to obovate, 3–6 × 1–4 mm, translucent, white to pale green, glabrous, apex rounded to truncate, margin entire, aciliate. *Staminate flowers*: pedicels to 12 mm long, glabrous; tepals 4, spreading to reflexed, outer 2 ovate, 4–8 × 2.5–4 mm, apex rounded, usually pink, orange, or red, rarely white, glabrous, margin entire, aciliate, inner 2 elliptic to obovate, 5–8 × 2–4 mm, apex rounded, the same colour as the other tepals, glabrous, margin entire, aciliate; stamens 6–10, projecting, the same colour as the tepals, filaments 0.5–1 mm long, free, anthers ellipsoid, 1.5–2 × 0.1 mm, dehiscing via lateral slits, connectives not extending, symmetrically basifixed. *Pistillate flowers*: pedicels to 5 mm long; bracteoles lacking; tepals 5, subequal, deciduous in fruit, spreading to reflexed, ovate, 5–6 × 2–4 mm, apex rounded, usually pink, orange, or red, rarely white, glabrous, margin entire, aciliate; ovary body obdeltoid, 2–3 × 3–6 mm, pale green, white, pink, orange, or red, glabrous to tomentose, equally 3-winged, wings horn-shaped, sometimes ascending ca 1.5–2 × 3–6 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, the same colour as the tepals, free, 2–5 mm long, 2–3 times divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 10 mm long. *Fruit body* ovoid, to 6 × 6 mm, drying light brown, wings same shape as in ovary, expanding to 12 × 6 mm, column at the apex of the ovary elongating to 18 mm.

### Proposed conservation assessment

Locally common and widespread in Peru and as far north as Costa Rica. Its EOO is > 1 900 000 km$^2$ and includes numerous protected areas. We assess *B. urticae* as Least Concern (LC).

### Notes

Ruiz and Pavón collected a number of specimens of *B. urticae* and it appears from two unpublished illustrations of this species housed in Madrid (MA-AJB04-D-1400, MA-AJB04-D-1398) that they intended to publish some of this material as *B. rosea* and *B. coccinea*. Ruiz and Pavón never completed an account of the Begoniaceae for their *Flora Peruviana et Chilensis* so these remain as unpublished names.

### Synonymy notes

We clarify here the correct author string for the name *B. columnaris* var. *glabra*. The name *Sassea glabra* Klotzsch was first published as a nom. nud. (Klotzsch 1854) before being published as a valid and legitimate name a year later (Klotzsch 1855). In 1864, Alphonse Pyramus de Candolle treated this name as a variety of his *C. columnaris* as *C. columnaris* var. *glabra* (de Candolle 1864: 274). It is clear de Candolle based this name upon Klotzsch's *S. glabra* because he cited the protologue of this name. Later, Smith & Schubert (1941a: 187) transferred the name *C. columnaris* and its varieties into the genus *Begonia* but cited the authorship of *B. columnaris* var. *glabra* as "(A.DC.) L.B.Sm. & B.G.Schub.".

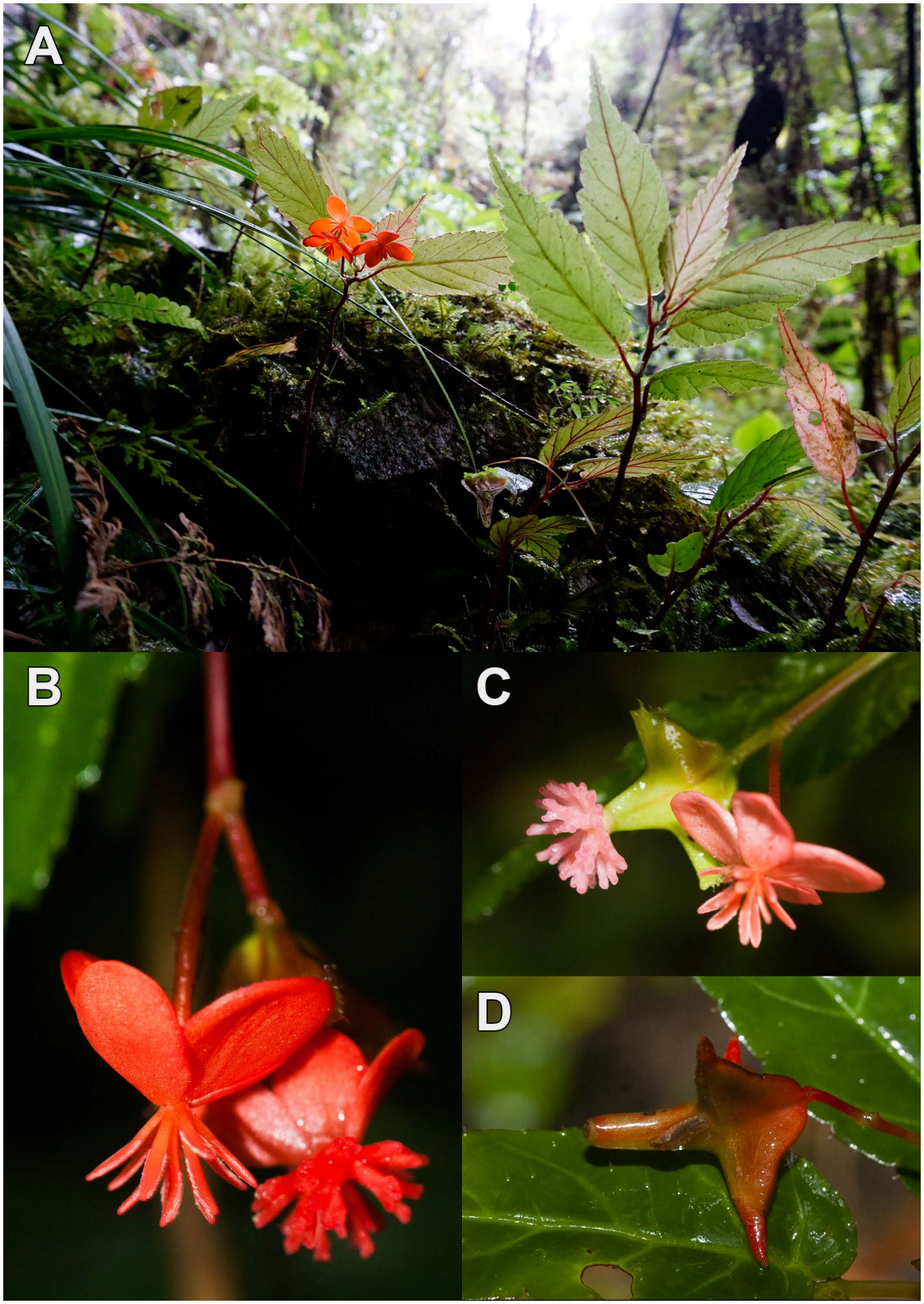


**Fig. 23.** *Begonia urticae* L.f. **A**. Habit. **B**. Inflorescence, showing staminate and pistillate flowers, red variant. **C**. Inflorescence, showing staminate flowers and developing fruit, pink variant. **D**. Fruit. All photographs by P.W. Moonlight from *P.W. Moonlight & A. Daza 1276* (A, D) in Bagua Province, Amazonas Region and *73* (B, C) in Cutervo Province, Cajamarca Region.

This is not correct, as the author of the basionym was Klotzsch, so the correct author string should be "*B. columnaris* var. *glabra* (Klotzsch) A.DC.".

**Typification notes**

The protologue of *B. urticae* includes the citation 'Hæc Dr. Mutis' (Linnaeus 1781), implying that Carl Linnaeus the younger used material collected during Mutis's expedition to modern day Colombia to describe the species. Previous authors have struggled to locate the material used; for example, Smith & Wasshausen (1979) stated it may be housed in M herbarium. Following his death, Linnaeus the younger's collections were sold to the Linnean society of London by his widow. This collection contains a single duplicate collected by Mutis labelled as '*urticae*' and matching Linnaeus the younger's description (LINN1125.3). We designate this sheet as the lectotype of *B. urticae* herein. There is a single specimen of the same species collected by Mutis in MA herbarium (MA660695), which may be a duplicate of this collection.

Bentham described *B. columnaris* Benth. and *B. trachyptera* Benth. based upon collections made by Karl Theodor Hartweg (Bentham 1845: 131, 184). Hartweg's main collections were deposited at Kew, which is also where Bentham was based so it is appropriate to designate lectotypes at K. The type collection of *B. columnaris* is *K.T. Hartweg 740* and there are two collections in K, including a barcoded specimen (K000536702). This specimen was included in the Kew negative collection (#11506) so has been used as a de facto type for many years, so we designate it as the lectotype of *B. columnaris*. There is only a single sheet of *K.T. Hartweg 1023* at Kew (K000536703), which is the type collection of *B. trachyptera*, so we designate this as the lectotype herein.

Klotzsch described *C. coccinea* Klotzsch based upon material collected by Ruiz and Pavón collected in Muña (Klotzsch 1855: 248). A specimen in Berlin herbarium matches this material and has been determined as "*Casparya coccinea* Kl." Photographs of this specimen are found in several international herbaria used as the de facto type. We designate this in B specimen as the lectotype of this name.

The protologue of *Sassea glabra* Klotzsch cited material in "Herb. Ruizii Mss." collected in the Andes of Muña and labelled as *"Begonia cucullata*" (Klotzsch 1855: 254). Despite a thorough search of European herbaria, we have not been able to find any specimens collected by Ruiz that were also collected in Muña. A specimen in HAL herbarium however is labelled as "*Begonia cucullata*" and has a complex history. It was incorporated into the Lambert herbarium, most likely between 1816 and 1824. Lambert's herbarium was sold in 1842, and this specimen was probably sold to Berlin as part of Lot 102, where it was worked on by Klotzsch. At a later, unclear date, the specimen became part of HAL herbarium where it now has the barcode HAL0121733. Upon incorporation into HAL herbarium, the specimen was remounted and given a new typed label. It seems likely that some data, perhaps including the locality, was lost in this process. As this specimen was definitely seen by Klotzsch and probably is the specimen cited in his locality, we designate this as the lectotype of *S. glabra* herein.

The protologue of *C. urticae* var. *hispida* A.DC. included reference to two specimens collected in Colombia by I.F. Holton and material collected in Costa Rica by Hoffmann, variously distributed in herbaria in Berlin, Kew, and Geneva (de Candolle 1864: 274). We designate a collection of *C. Hoffmann 736* in Berlin (B100243045) as the lectotype of *C. urticae* var. *hispida* herein as it has both flowers and fruit. This sheet was also photographed by J.F. Macbride (photo #20856) in the 1930s and the photograph distributed to various US and European herbaria, so has been used as a de facto type for almost a century.

In the protologue of *B. monticola* C.DC., Anne Casimir Pyramus de Candolle cited collections of *A. Sodiro 584* and *592* in 'herb Candolle' in Geneva (de Candolle 1908: 325). The de Candolle herbarium usually refers to the herbarium of the Prodromus in Geneva, which is now referred to as G-DC but there

are no sheets of either collection in G-DC. We have however seen two duplicates of *A. Sodiro 592* in the general collection in Geneva (G), both of which have labels headed 'Herbier de Candolle'. Of these, one was photographed by J.F. Macbride (photo #24195) and has therefore been used as a de facto type. This sheet is an excellent collection, including flowers, fruits, and a whole plant so we designate it the lectotype of *B. monticola* herein.

**Identification notes**

*Begonia urticae* is the most common Peruvian member of *B.* sect. *Casparya*, which can be recognised by its three-horned rather than three-winged fruits. Species of this section are also unusual in that their androecium and gynoecium are the same colour as their tepals, which are white, pink, orange, or red in *B. urticae*, rather than yellow. It can be distinguished from *B. hirta* and *B. condorensis* sp. nov. by its much smaller staminate (≥ 8 mm long vs ≤ 9 mm long) and pistillate (≥ 6 mm long vs ≤ 9 mm long) tepals.

**Distribution and ecology**

Known from Peru, Ecuador, Colombia, Venezuela, Panama, and Costa Rica. Within Peru, collected in Amazonas, Piura, Cajamarca, San Martín, Huánuco, Pasco, and Cusco Regions (Fig. 21B). Found within northern Peruvian relict montane forest at an elevation of 2100–3200 m a.s.l., and within lower, middle, and upper montane Forest elevations of 1420–3370 m a.s.l. Typically collected as an epiphyte or lithophyte or more rarely as a terrestrial herb. It is only found within the most humid of forests or humid microhabitats, such as cave mouths or streams. The red, pink, or orange flowers of the species suggest it is pollinated by hummingbirds, but the flower lacks other obvious adaptations for bird pollination. The horned fruits of *B. urticae* appear adapted for dispersal by water drops.

***Begonia*** sect. ***Cyathocnemis*** (Klotzsch) A.DC.

*Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 332 (de Candolle 1864). – *Cyathocnemis* Klotzsch, *Gattungen und Arten* 1854: 247 (Klotzsch 1855). – **Type**: holotype: *Cyathocnemis obliqua* Klotzsch = *Begonia cyathophora* Poepp. & Endl.

**Synonymy notes**

For a full list of sectional synonyms, see Moonlight *et al.* (2018).

**Notes**

This section was first described as a genus by Klotzsch (1855: 220) to include his *Cyathocnemis obliqua* Klotzsch nom superfl., which had two staminate tepals, two pistillate tepals, and bifid placentae. Alphonse Pyramus de Candolle (1864: 122) later treated this genus as a section with a single species, *B. cyathophora*, separated from *B.* sect. *Ruizopavonia* by its fused bracts. Doorenbos *et al.* (1998) had a different concept of the section, which they delimited to include seventeen species with transversely ovate leaves, while *B.* sect. *Ruizopavonia* included species with straight leaves. Doorenbos *et al.*'s (1998) concept of the section included for the first time several species with five tepals on the pistillate flowers and species lacking fused bracts. Moonlight *et al.* (2018) largely followed this circumscription, but included one species and excluded another based upon phylogenetic evidence. This later circumscription is similar to Doorenbos *et al.*'s (1998) but the two sections are now better distinguished by their venation rather than their leaf shape: *B.* sect. *Cyathocnemis* now includes species with palmate or palmate-pinnate venation, while *B.* sect. *Ruizopavonia* includes species with pinnate venation.

While the distinction between *B.* sect. *Cyathocnemis* and *B.* sect. *Ruizopavonia* is mostly clear (though see notes under *B.* sect. *Ruizopavonia*), it is more difficult to distinguish the section from members

of *B.* sect. *Hydristyles*. Doorenbos *et al.* (1998) distinguished this section by its irregularly multifid styles but Moonlight *et al.* (2018) and Moonlight & Reynel (2018) have since included two species with multifid styles in *B.* sect. *Cyathocnemis*, with their placements supported by molecular evidence. *Begonia* sect. *Hydristyles*, however, remains poorly sampled in molecular analyses and poorly known morphologically so it remains to be seen whether it is a natural group and if so, how it should be defined.

The centre of diversity for *B.* sect. *Cyathocnemis* is Peru, where 17 of the 20 species assigned with confidence to the section are found (with four non-Peruvian species being tentatively assigned to the section; Moonlight *et al.* 2018). This treatment therefore represents a revision of most of the section and the species concepts we present here are significantly different to those of previous floristic accounts. We describe five new species in addition to two described by Moonlight & Reynel (2018) and describe a sixth, *B. imbrexiformis* Moonlight sp. nov., but only tentatively assign it to the section (see notes under *B. imbrexiformis* sp. nov.). Finally, we propose five new synonyms within a much-expanded concept *of B. bracteosa*.

### 9. ***Begonia amoeboides*** Moonlight
Figs 24A, 25

*Phytotaxa* 381 (1): 119 (Moonlight & Reynel 2018). – **Type**: PERU – **Amazonas Region: Prov. Bongará** • Dist. Yambrasbamba, road from Amazonas to Rioja; 5°41′22″ S, 77°49′11″ W; 2088 m a.s.l.; 31 Jan. 2016; *P.W. Moonlight & A. Daza 150*; holotype: MOL; isotypes: E [E00934304], K, MO [MO-3237376].

*Begonia lophoptera* Rolfe pro parte in R.Vásquez *et al.*, *Arnaldoa* 12 (1–2): 112–125 (Vásquez *et al.* 2005).

*Begonia tiliifolia* auct. non C.DC.: R.Vásquez *et al.*, *Arnaldoa* 12 (1–2): 112–125 (Vásquez *et al.* 2005).

#### Etymology

The epithet refers to the irregularly multifid stigmas of the species, which resemble the irregularly branching pseudopods of amoebae.

#### Selected specimens examined

PERU – **San Martín Region: Prov. Rioja** • Dist. Pardo Miguel, Km 382–385 Moyabamba-Bagua road; 1850–1950 m a.s.l.; 5°41′ S, 77°39′ W; 17 Feb. 1984; *D.N. Smith 6005*; MO [MO-1642478], US [US00672858], USM. – **Amazonas Region: Prov. Bongará** • Dist. Yambrasbamba, Road from Amazonas to Rioja; 5°41′16″ S, 77°47′10″ W; 2075 m a.s.l.; 3 Jul. 2018; *P.W. Moonlight 1258*; E, USM. – **Pasco Region: Prov. Oxapampa** • Dist. Huancabamba, Sector Oso Playa, camino hacia el campamento; 2478 m a.s.l.; 10°18′52″ S, 75°34′31″ W; 22 Oct. 2009; *L. Valenzuela, A. Monteagudo, M. Cueva, A. Peña, J. Mateo & R. Rivera 13842*; HOXA, E [E00934198], MO [MO-2991353], USM • Zona de amortiguamiento del Parque Nacional Yanachaga-Chemillén, Sector Oso Playa, camino a la parcela Oso Playa, 2500 m a.s.l.; 10°19′20″ S, 75°36′06″ W; 17 Jun. 2006; *A. Monteagudo, L. Cárdenas, A. Peña, J.L. Mateo & R. Francis 12001*; HOXA, MO [MO-2183947], US [US00951211], USM • Trail to summit of Cordillera Yanachaga via río San Daniel; 2700 m a.s.l.; 10°23′ S, 75°27′ W; 13 Jul. 1984; *D.N. Smith 7801*; MO [MO-1835942], USM • Parque Nacional Yanachaga-Chemillén, Sector San Daniel-Quebrada Colmena; 1951 m a.s.l.; 10°27′25″ S, 75°27′20″ W; 26 Feb. 2009; *R. Vásquez, L. Valenzuela & R. Rivera 35403*; HOXA, E [E00934197], MO [MO-3009205], USM.

#### Description

Caulescent herb, to 150 cm high. *Stem* erect, occasionally branching; internodes to 15 cm long, to 8 mm thick, succulent, dark green to dark red, sparsely to densely pilose. *Stipules* deciduous, lanceolate, 10–40

× 5–10 mm, apex acute, translucent, pale green to dark brown, glabrous, margin entire, aciliate, the base surrounded by squamous hairs. *Leaves* > 5, alternate, basifixed; petiole 3.5–13.5 cm long, dark green to dark red, densely pilose; blade subsymmetric, reniform, to 11 × 16 cm, sub-succulent, apex broadly rounded, base truncate to cordate, basal lobes not overlapping, sinus to 20 mm deep, margin irregularly double-dentate, with 2–8 cusps around the lamina, ciliate, upper surface green, sparsely pilose, lower

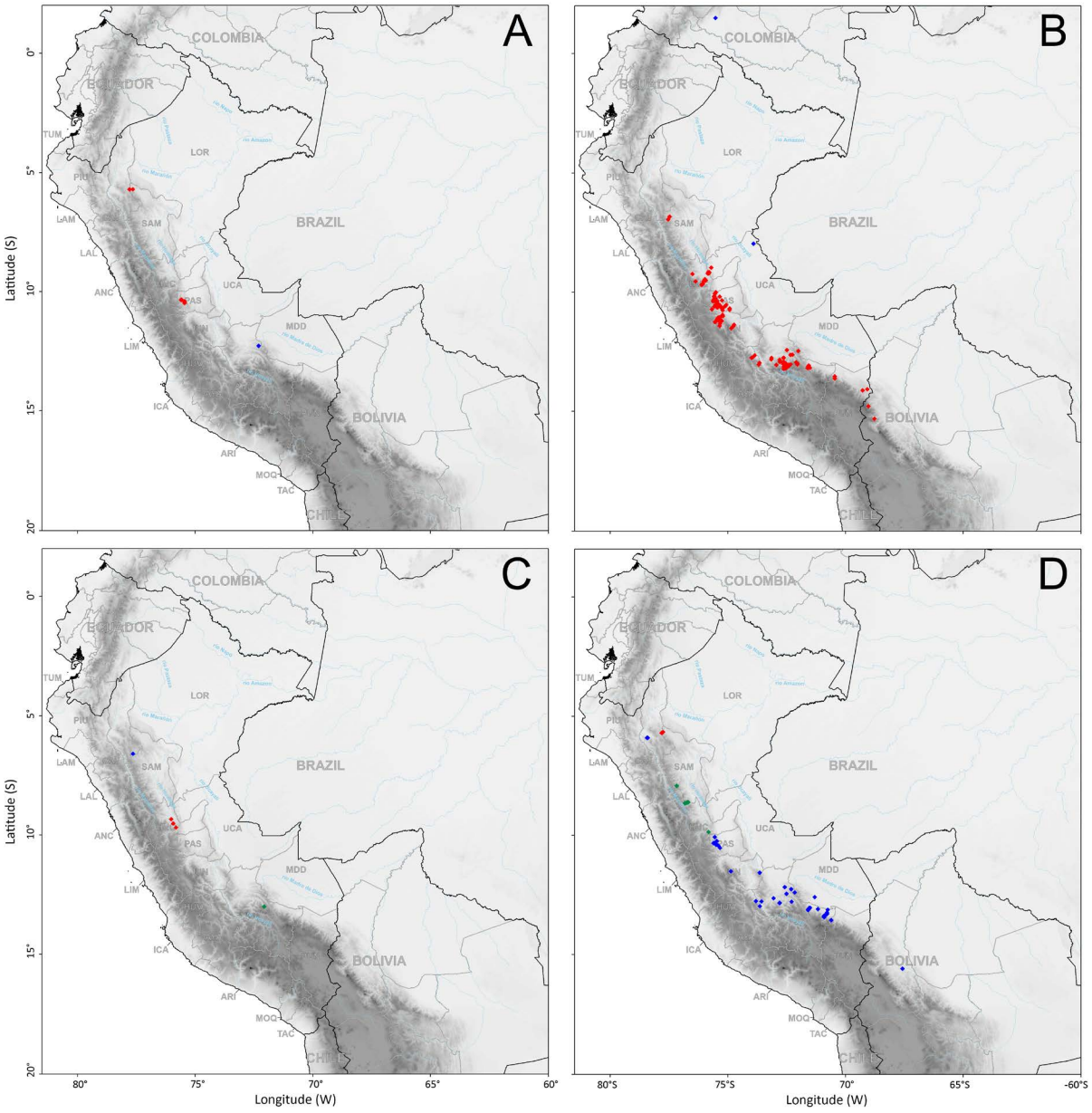


**Fig. 24.** Distribution of *Begonia* sect. *Cyathocnemis* (Klotzsch) A.DC. in Peru and surrounding countries. **A**. *B. amoeboides* Moonlight (red) and *B. imbrexiformis* Moonlight sp. nov. (blue). **B**. *B. bracteosa* A.DC. (red) and *B. longinqua* Moonlight (blue). **C**. *B. cyathophora* Poepp. & Endl. (red), *B. serratistipula* Moonlight sp. nov. (blue) and *C. vargasii* Moonlight sp. nov. (green). **D**. *B. lamolina* Moonlight (red), *B. lophoptera* Rolfe (blue) and *B. obtecticaulis* Irmsch. (green). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

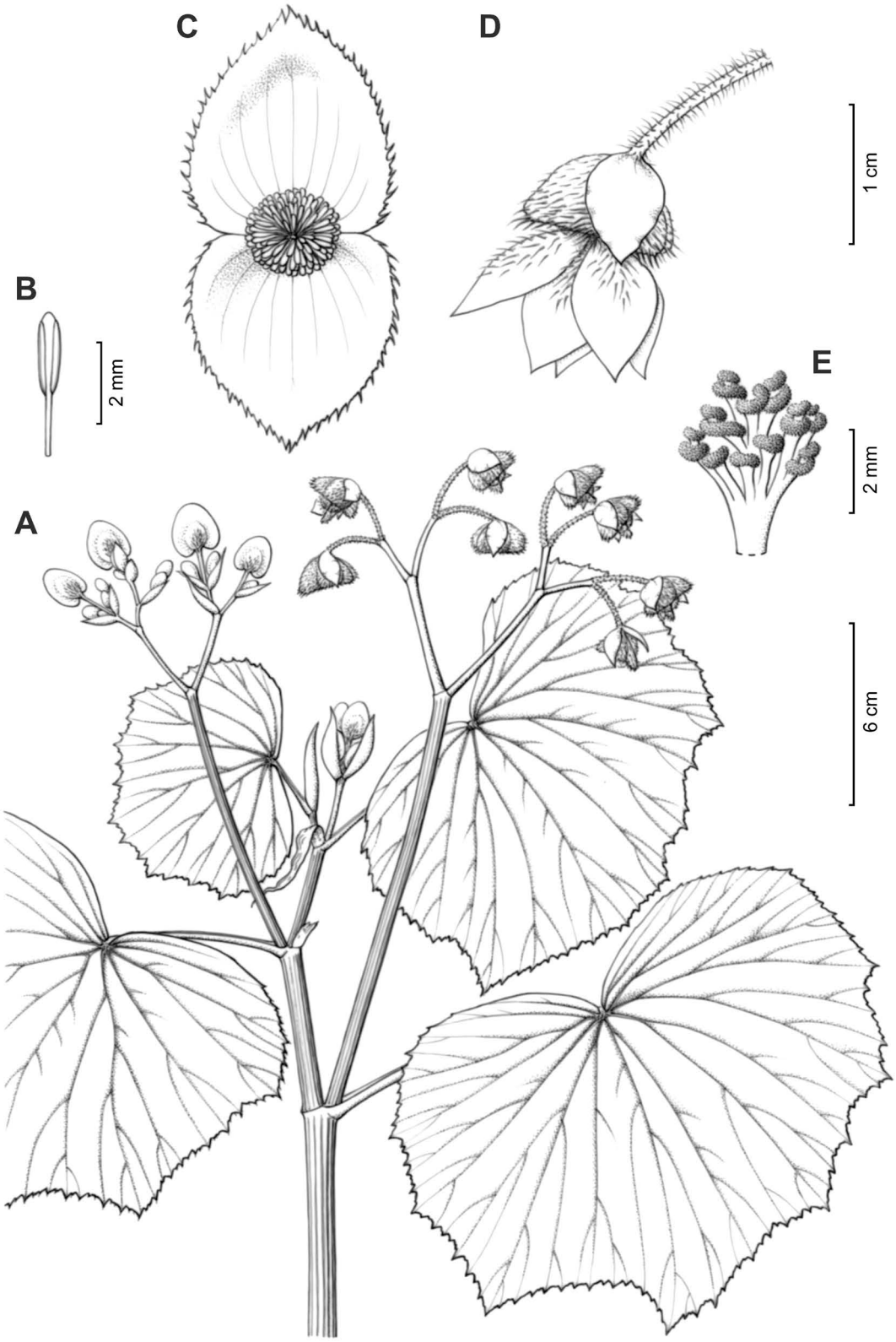


**Fig. 25.** *Begonia amoeboides* Moonlight. **A**. Habit. **B**. Stamen, front view. **C**. Staminate flower, front view. **D**. Pistillate flower, side view. **E**. Pistils, side view. Illustration by Claire Banks from *P.W. Moonlight & A. Daza 150* (E).

surface pale green, sparsely pilose, densely pilose on the veins, veins palmate, 8–12 veined from the base. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with up to 8 branches, bearing up to 16 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 10 cm long, pale green to pale red, sparsely to densely pilose, bracts deciduous, lanceolate to ovate, 6–13 × 3–8 mm, translucent, white, glabrous to sparsely pilose, apex acute, margin entire, ciliate. *Staminate flowers*: pedicels to 15 mm long, sparsely pilose; tepals 2, spreading, ovate, 8–18 × 7–15 mm, apex acute, white or rarely pink, inner surface glabrous, outer surface pilose, margin entire to irregularly serrate, aciliate to ciliate; stamens 60–100, spreading, yellow, filaments 1–1.5 mm long, free, anthers linear, ca 2 × 0.8 mm, dehiscing via lateral slits, connectives extending to 0.4 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles 3, positioned directly beneath the ovary, lanceolate to circular, 8–10 × 4–6 mm, apex acute, translucent, white, glabrous to short-pilose, margin entire, aciliate to ciliate; tepals 5, subequal, deciduous in fruit, projecting, lanceolate to ovate, 9–10 × 4–6 mm, apex acute to obtuse, white or rarely pink, inner surface glabrous, outer surface sparsely pilose, margin entire, aciliate; ovary body ovoid, 4–11 × 2–6 mm, pale green, sparsely pilose, unequally 3-winged, wings triangular, the largest wing notched, 4–10 × 2–7 mm, smallest 4–9 × 1.5–2.5 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 5–6 mm long, many times divided, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 25 mm long. *Fruit body* ovoid, to 14 × 7 mm, drying brown, wings same shape as in ovary, the largest expanding to 12 × 10 mm, the smallest to 12 × 4 mm.

**Proposed conservation assessment**

Assessed by Moonlight & Reynel (2018) as Data Deficient (DD).

**Identification notes**

Within its range, *B. amoeboides* can only be confused with *B. lophoptera*. When in flower, these two species can easily be distinguished by the number of petals on the pistillate flower (five in *B. amoeboides* vs two in *B. lophoptera*) but they are difficult to distinguish when sterile. *Begonia amoeboides* can be identified by its straight, reniform leaves, which lack a distinct apex (transverse, ovate, and with a distinct apex in *B. lophoptera*) and its deciduous, lanceolate stipules (vs persistent and reniform to ovate or rarely broadly lanceolate).

**Distribution and ecology**

Endemic to Peru and known from Amazonas, San Martín, and Pasco Regions (Fig. 24A). Found in upper and middle montane forest at elevations of 1850–2930 m a.s.l., where it is typically collected on wet banks. In Amazonas Region, *B. amoeboides* Moonlight has been observed growing adjacent to *B. lamolina* Moonlight and collections in Pasco Region were made at the same locality as *B. lophoptera* Rolfe. These three species are closely related, but no hybrids are known from either population.

10. ***Begonia bracteosa*** A.DC.
Figs 4A, 5B, 6A, 24B, 26, 27

*Annales des Sciences Naturelles Botanique, Série 4* 11: 132 (de Candolle 1859). – **Type**: COUNTRY UNKNOWN • *s.c.*, *s.n.*; lectotype: K [K000536745], **designated here**.

de Candolle (1864: 331); Smith & Schubert (1941a: 186); Irmscher (1949: 583); Vásquez *et al.* (2005: 112–125); Brako & Zarucchi (1993: 191).

*Begonia subciliata* A.DC. *Annales des Sciences Naturelles Botanique, Série 4* 11: 132 (de Candolle 1859). – **Type**: PERU • *J.A. Pavón s.n.*; lectotype: G ex G-BOIS [F neg. 8518], **designated here**; syntype: PERU • *J.A. Pavón s.n.*; G ex G-BOIS. **Syn. nov.**

de Candolle (1864: 331); Smith & Schubert (1941a: 186); Irmscher (1949: 586); Brako & Zarucchi (1993: 195).

*Begonia roezlii* Regel, *Gartenflora* 25: 194 (von Regel 1876). – **Type**: lectotype: plate 871 in Gartenflora 25, 1876, **designated here**. **Syn. nov.**

*Begonia roezlii* Lynch (nom. illeg.; later homonym non Regel), *The Gardeners' Chronicle, New Series II* 11: 566 (Lynch 1879). – *Begonia lynchiana* Hook.f. *Curtis's Botanical Magazine* 110: t. 6758 (Hooker 1884). – **Type**: neotype: plate CDII in The Garden, 24: 162 (Lynch 1883), **designated here**. **Syn. nov.**

*Begonia subciliata* var. *persicina* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 588 (Irmscher 1949). – **Type**: PERU – **Junín Region: [Prov. Chanchamayo]** • Pichis Trail, Eneñas; [10°45′ S, 75°13′ W]; 1600 m a.s.l.; 28 Jun.–8 Jul. 1929; *E.P. Killip & A.C. Smith 25613*; lectotype: US [US00115461], **designated here**; isolectotype: NY [NY03091030]. – **[Pasco Region: Prov. Oxapampa]** • Pichis Trail, between San Nicolas and Azupizú; [10°41′ S, 74°55′ W]; 650–900 m a.s.l.; 6 Jul. 1929; *E.P. Killip & A.C. Smith 26118*; syntype: F; isosyntypes: NY [NY03091031], US [US00222023]. **Syn. nov.**

Brako & Zarucchi (1993: 195); Vásquez *et al.* (2005: 112–125); León & Monsalve (2006: 169).

*Begonia tribracteata* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 589 (Irmscher 1949). – **Type**: PERU – **Ayacucho Region** • Ccarrapa, between Huanta and río Apurimac; [12°43′ S, 73°55′ W]; 1500 m a.s.l.; 5–17 May 1929; *E.P. Killip & A.C. Smith 22326*; lectotype: F [V0042332F], **designated here**; isolectotypes: NY [NY01085486], US [US00115474]. **Syn. nov.**

Brako & Zarucchi (1993: 195); León & Monsalve (2006: 169).

*Begonia suprafastigiata* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74 (Irmscher 1949: 590). – **Type**: PERU – **Cusco Region: Prov. Calca** • Lares valley above Mantoc; [12°57′ S, 72°05′ W]; 2700 m a.s.l.; 8 Mar. 1929; *A. Weberbauer 7907*; lectotype: B [B100243054], **designated here**; isolectotypes: F [V0042330F], NY [2: NY03091032, NY03091033], US [US00955808]. **Syn. nov.**

Vásquez *et al.* (2005: 112–125).

*Begonia ciliata* Pav. ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia subciliata* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 331 (de Candolle 1864).

*Begonia cyathophora* auct. non Poepp. & Endl.: R.Vásquez *et al.*, *Arnaldoa* 12 (1–2): 112–125 (Vásquez *et al.* 2005).

*Begonia suspinulosa* auct. non Irmsch.: R.Vásquez *et al.*, *Arnaldoa* 12 (1–2): 112–125 (Vásquez *et al.* 2005).

*Begonia cyathophora* Poepp. & Endl. pro parte in L.B.Sm. & B.G.Schub., *Publications of the Field Museum of Natural History, Botanical Series* 13 (4/1): 186, (Smith & Schubert 1941a).

*Begonia albomaculata* C.DC. pro parte in Brako & Zarucchi, *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: 191 (Brako & Zarucchi 1993).

*Begonia cyathophora* Poepp. & Endl. pro parte in Brako & Zarucchi, *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: 191 (Brako & Zarucchi 1993).

*Begonia lophoptera* Rolfe pro parte in R.Vásquez *et al., Arnaldoa* 12 (1–2): 112–125 (Vásquez *et al.* 2005).

### Etymology

Named for the large bracts that protect the developing inflorescence in this species.

### Selected specimens examined

PERU • *H. Ruiz & J.A. Pavón s.n.*; G ex G-BOIS, possible isolectotype of *Begonia subciliata* A.DC • *H. Ruiz & J.A. Pavón s.n.*; G-DC ex G-BOIS, possible isolectotype of *Begonia subciliata* A.DC. – **San Martín Region: Prov. Huallaga** • Abajo de La Morada; 6°57′ S, 77°32′ W; 2000–2200 m a.s.l.; 12 Aug. 1997; *V. Quispuscoa S. & J. Bardales 1013*; HUT, US [US00673154] • Dist. Saposoa, al Noroeste

de Añazco Pueblo; [6°50′ S, 77°28′ W]; 2000–2100 m a.s.l.; 5 Sep. 2000; *V. Quispuscoa S., S. Leiva G., Y. Díaz V. et al. 2357*; HUT. – **Prov. Mariscal Cáceres** • La Morada y el río Huayabamba; [7°01′ S, 77°19′ W]; 1900–2200 m a.s.l.; 29 Jun. 1995; *V. Quipuscoa S. 84*; HUT. – **Huánuco Region: Prov. Marañón** • Centro poblado Chipaco, sector Nueva Sena; 9°14’05.21”S, 76°29’42.77”W; 1450 m a.s.l.; 24 Jul. 2021; *P. González & P. Arista 10062*; USM. – **Prov. Leoncio Prado** • Dist. Hermilío Valdizán: La Divisoriam km 194; [9°11′ S, 75°48′ W]; [ca 1600 m a.s.l.]; 13 Aug. 1945; *C.A. Ridoutt 12997*; MO [MO-1642862], USM • La Divisoria, ca 20 km NNE of Tingo María on road to Pucallpa; [9°12′ S, 75°48′ W]; ca 1600 m a.s.l.; 11 Jul. 1981; *M.O. Dillon 2633*; F, USM • Arroyo Bravo, about 40 km from Tingo María on highway to Pucallpa; [9°13′ S, 75°51′ W]; ca 1350 m a.s.l.; 1 Nov. 1949–5 Jan. 1950; *H.A. Allard 20378*; US [US00222063]. – **Prov. Huánuco** • Dist. Mariano Damaso Beraun: Fundo Honolulo, entre Cayumba y Tingo María; [9°27′ S, 75°59′ W]; 600–650 m a.s.l.; 8 Aug. 1947; *R.A. Ferreyra 2272*; USM [2] • Carpish entre Huánuco y Tingo María; [9°30′ S, 75°56′ W]; 800–900 m a.s.l.; 15 Jul. 1948; *R. Ferreyra 4222*; MO [MO-2264385], MOL, USM • Cuesta de Carpish; [9°42′ S, 76°06′ W]; 1600 m a.s.l.; *C. Vargas 160*; USM. – **Ucayali Region: Prov. Padre Abad** • Dist. Padre Abad, cerca a río Chino; [8°58′ S, 75°42′ W]; 1400–1600 m a.s.l.; 11 Jun. 1976; *J. Schunke V. 9221*; MO [2: MO-1642856, MO-1642857], NY, US [2: US00222051, US00222054] • km 212; [9°09′ S, 75°47′ W]; 12 Aug. 1943; *C.A. Ridoutt 13112*; USM • [Dist. Hermilío Valdizán], Divisoria, 6 Sep. 1947; [9°10′ S, 75°47′ W]; 1600 m a.s.l.; *F. Woytkowski 34491*; BM, G, MO [MO-1642852], US [US00222059]. – **Pasco Region: Prov. Oxapampa** • Dist. Pozuzo, Parque Nacional Yanachaga-Chemillén, carretera cerca a la Quebrada Misho; 10°10′ S, 75°34′ W; 1210 m a.s.l.; 14 Apr. 2003; *A. Monteagudo, G. Ortiz & R. Francis 4993*; E [2: E01007256, E01007257], HOXA [2], MO [MO-2991519] • Along road Chatarra-Cacazu; 10°32′ S, 75°04′ W; 890 m a.s.l.; 13 Jul. 2003; *H. van der Werff, R. Vásquez, B. Gray, R. Ortiz & N. Davila 18427*; HOXA, MO [MO-1102987], NY, US [US00843931] • Dist. Palcazu, Bosque de Protección San Matias-San Carlos; 10°44′ S, 74°55′ W; 900–1600 m a.s.l.; 7 Jul. 2002; *R. Vásquez & A. Monteagudo 27716*; HOXA, MO [2: MO-3009218, MO-3009238], USM. – **Junín Region: Prov. Tarma** • 38.4km NE of Tarma on Carretera 20B to Oxapampa; [11°14′ S, 75°31′ W]; 2036 m a.s.l., 13 Nov. 1979; *J. Jones 9106*; MO [MO-1642850], NY • Huacapistana; [11°15′ S, 75°31′ W]; 1800–2400 m a.s.l.; 5–8 Jun. 1929; *E.P. Killip & A.C. Smith 24097*; NY, US [US00222027] • ibid.; *E.P. Killip & A.C. Smith 24110*; NY, US [US00222026]. – **Prov. Chanchamayo** • Colonia Perene; [10°57′ S, 75°13′ W]; ca 680 m a.s.l.; 14–26 Jun. 1929; *E.P. Killip & A.C. Smith 24988*; F, NY, P [P05587391], US [US00222322] • Valley of río Tulumayo, ca 10 km S of San Ramón; ca 11°15′ S, 75°20′ W; 800–900 m a.s.l.; *A.H. Gentry, D. Smith & N. Jaramillo 41526*; MO [MO-2154626], US [US00672866], USM • ca 8.5 km NW of San Ramón on dirt road along E side of río Oxabamba valley; 11°30′50″ S, 75°24′20″ W; 1096 m a.s.l.; 22 Jun. 2014; *P.W. Moonlight & A. Daza 25*; E [E00724450], MOL, USM. – **Prov. Jauja** • Road from Monobamba to Jauja; 11°24′54″ S, 75°20′40″ W; 1977 m a.s.l.; 17 Feb. 2016; *P.W. Moonlight & A. Daza 265*; E [E00885551], MOL. – **Prov. Satipo** • 20 km SW of Satipo on road to Concepción; [11°22′ S, 74°44′ W]; 1000 m a.s.l.; 25 May 1979; *D.C. Wasshausen & F. Enarnación 1102*; G, K, US [US00222342], USM • Road Satipo-Comas, above Mariposa; 11°26′27.6″ S, 74°46′54.4″ W; 1430 m a.s.l.; 1 Oct. 2007; *R.T. Pennington & A. Daza 1993*; E [E00567573], MOL • Road from Comas to Satipo; 11°30′39″ S, 74°50′52″ W; 2550 m a.s.l.; 13 Feb. 2016; *P.W. Moonlight & A. Daza 232*; E [E00885604], MO [MO-3254811], MOL. – **Ayacucho Region: Prov. La Mar** • Along roadside between Machente and Rosario; [12°39′ S, 73°51′ W]; 1100 m a.s.l.; 15 Sep. 1976; *D.C. Wasshausen & F. Encarnación 665*; K, US [US00222343], USM • Between El Tambo and Ayna; [12°45′ S, 73°59′ W]; 2375 m a.s.l.; 3 Feb. 1974; *T. Plowman & E. Wade Davis 4687*; USM • Dist. Anco; [12°58′ S, 73°39′ W]; 2150 m a.s.l.; 20 Jun. 2001; *J. Roque & C. Arana 3011*; USM. – **Cusco Region: Prov. Quispicanchis** • Tio to Huarayaca; 1960 m a.s.l.; 28 Jan. 1943; *J.H. Vargas López 3156*; MO [MO-2264402]. – **Prov. Calca** • Dist. Lares, Suyo; 12°28′ S, 71°35′ W; 2634 m a.s.l.; 16 Jun. 2005; *L. Valenzuela, E. Suclli, I. Huamantupa, J. Farfán, N. Anaya, H. Coasaca & J. Tito 5671*; MO [MO-2153592], US [US00932206] • Road Quebrada-Alto Lacco; 12°37′22″ S, 72°14′40″ W; 2800 m a.s.l.; 30 Apr. 2006; *H. van der Werff, L. Valenzuela, E. Suclli & A. Carazas 21180*; K, MO [MO-2184528], US [US00951227] • Road between Calca and Colca, descending

to Colca; 13°01′48″ S, 72°02′10″ W; 2000–2600 m a.s.l.; 27 Apr. 2006; *H. van der Werff, L. Valenzuela, E. Suclli & A. Carazas 21014*; MO [MO-1839263]. – **Prov. Urubamba** • Dist. Ollantaytabmbo, road from Ollantaytambo to Quebrada Honda; 13°01′28″ S, 72°19′29″ W; 2573 m a.s.l.; 7 Aug. 2014; *P.W. Moonlight & A. Daza 99*; E [E00724461], MOL, USM • Urubamba valley, Machu Picchu; [13°10′ S, 72°32′ W]; ca 1525 m a.s.l.; 9 May 1939; *E.K. Balls 6818*; E [E00299515], K [2], US [US00222025] • Dist. Machu Picchu, Aobamba; 13°12′ S, 72°33′ W; 2383 m a.s.l.; 16 Apr. 2003; *L. Valenzuela, G. Calatayud & I. Huamantupa 1821*; MO [MO-492891]. – **Prov. Paucartambo** • 6–10 km from Puente Manto Jan. towards Amparaes along the main road between Amparaes and Quebrada Honda; 12°58′12″ S, 72°03′40″ W; 2600 m a.s.l.; 8 Nov. 2017; *T. Särkinen & M.Y. Correa 5303*; E [E01053435], USM • Dist. Kosñipata, San Pedro; 13°07′41″ S, 71°34′39″ W; 2210 m a.s.l.; 28 Oct. 2007; *R. Vásquez, C. Davidson, S. Davidson, J. Farfán, E. Suclli & A. Peña 32943*; MO [MO-2131220] • Wayqecha Biological Station, río Kosñipata watershed, near the road Paucartambo-Shintuya; 13°10′30″ S, 71°35′12″ W; 2200–3100 m a.s.l.; 31 May 2010; *J.L. Clark, L. Clavijo & M. Overstreet 11738*; NY [NY02862132]. – **Prov. La Convención** • Dist. Quellouno, Túpac Amaru; 12°25′46″ S, 72°29′10″ W; 1131 m a.s.l.; 17 Sep. 2007; *I. Huamantupa, G. Calatayud, J. Tito, B. Rado & R. Ayerbe 10358*; MO [MO-2132037]) • Dist. Quillabamba, Colcapampa, Maranura; [12°56′ S, 72°40′ W]; 1210–1435 m a.s.l.; 29–30 Dec. 1986; *P. Núñez, W. Cruz & M. Cruz 6775*; MO [MO-1835955], USM • Dist. Santa Teresa, road from Santa Teresa to Totora; 13°12′58″ S, 72°37′07″ W; 2005 m a.s.l.; 6 Aug. 2014; *P.W. Moonlight & A. Daza 87*; E [E00724446], MOL, USM. – **Puno Region: Prov. Carabaya** • Dist. Ollachea, entre Clavana y San Gabán; [13°32′ S, 70°27′ W]; 1000 m a.s.l.; Jun. 1982; *C.N. Ochoa & A. Salas 14853*; NY • Ollachea to San Gabán; [13°37′ S, 70°27′ W]; 1000–2000 m a.s.l.; 17–24 Jul. 1978; *M.O. Dillon, J. Aronson, A. Herra & P. Berry 1121*; MO [2: MO-2264399, MO-2264400], NY, US [US00222350]. – **Prov. Sandia** • 2–6 km from Oconeque; [14°04′ S, 69°04′ W]; 1800–2100 m a.s.l.; 22–26 May 1942; *R.D. Metcalf 30581*; MO [MO-1835961], US [US00222028] • Dist. Alto Inarnbari, Sector Mancuari; 14°06′54.5″ S, 69°15′44″ W; 1375 m a.s.l.; 26 Mar. 2000; *P. Zegarra, I. Marnani, V. Ayala, N. Marnari & J.P. Marnani 50*; MOL. – **Cultivated** • Grown in University of California Botanical Garden from seed from the ruins of Machu Picchu, collected during the University of California Botanical Garden Expedition to the Andes, accession 36.1773; 1939; *J. West 6416*; E [E00299514], MO [2: MO-1643584, MO-1835945], USM.

### Description

Caulescent herb, to 4 m high. *Stem* erect, branching; internodes to 14 cm long, to 12 mm thick, succulent, pale green to red, glabrous or rarely sparsely tomentose. *Stipules* deciduous, elliptic to ovate, 18–44 × 6–18 mm, apex acute to truncate, translucent to transparent at the margins, pale green, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 2–16 cm long, pale green to red, glabrous or rarely pilose; blade, asymmetric, ovate, to 25 × 15 cm, succulent, apex obtuse to short acuminate, base obliquely cordate, basal lobes not overlapping or overlapping only at the petiole apex, sinus to 35 mm deep, margin denticulate or denticulate to serrate or dentate, sometimes with short, triangular lobes to 1 cm long at the end of the major veins, ciliate, upper surface green, sometimes flushed red around the petiole apex, glabrous, lower surface glabrous or rarely pilose, lower surface green, sometimes flushed red around the petiole insertion, flushed red around the major veins, or completely red, glabrous or rarely sparsely pilose, veins palmate but with one primary vein, 7–9 veined from the base, with 1–3 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with up to 6 branches, bearing up to at least 100 staminate flowers and 100 pistillate flowers, protandrous; peduncle to 20 cm long, white, pale green, or red, glabrous or rarely sparsely pilose, bracts deciduous, ovate to elliptic, 7–35 × 1.5–23 mm, translucent to transparent at the margins, white, pink, or red, glabrous, apex acute to truncate, margin entire, aciliate. *Staminate flowers*: pedicels to 20 mm long, glabrous; tepals 2, spreading, broadly ovate, 6–17 × 6–18 mm, apex rounded, white, pink, or red, glabrous, margin entire, aciliate; stamens 20–50, spreading, yellow, filaments 0.5–2 mm long, free, anthers ellipsoid, 1.5–2.5 × 0.25–0.5 mm long, dehiscing via lateral slits, connectives


**Fig. 26.** *Begonia bracteosa* A.DC. **A**. Habit. **B**. Leaf, adaxial surface. **C**. Leaf, abaxial surface. **D**. Stipule, abaxial surface. **E**. Stipule, adaxial surface. **F**. Inflorescence with staminate and developing pistillate flowers. **G**. Developing inflorescence. **H**. First inflorescence bract, abaxial surface. **I**. Staminate flower, side view. **J**. Staminate flower, front view. **K**. Androecium, side view. **L**. Pistillate flower, side view. **M**. Pistillate flower, front view. **N**. Cross section of ovary. **O**. Pistils, side view. All photographs taken by D.A. Purvis in the living collections of the Royal Botanic Garden Edinburgh.

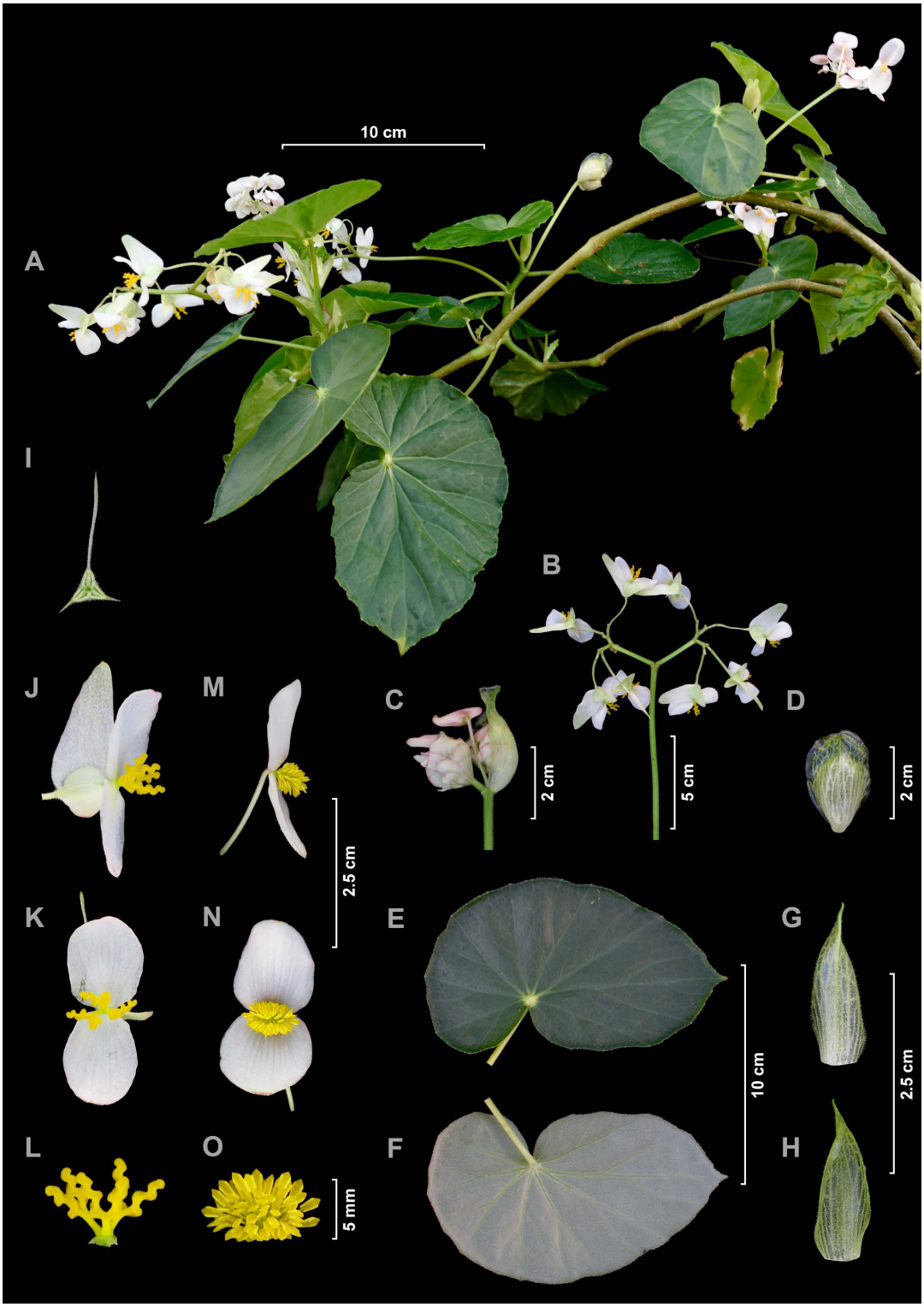


**Fig. 27.** *Begonia bracteosa* A.DC. **A**. Habit. **B**. Inflorescence. **C**. Developing inflorescence. **D**. first bract of inflorescence. **E**. Leaf, adaxial surface. **F**. Leaf, abaxial surface. **G**. Stipule, abaxial surface. **H**. Stipule, adaxial surface. **I**. Cross section of ovary. **J**. Pistillate flower, side view. **K**. Pistillate flower, front view. **L**. Pistils, side view. **M**. Staminate flower, side view. **N**. Staminate flower, front view. **O**. Androecium, side view. All photographs taken by D.A. Purvis in the living collections of the Royal Botanic Garden Edinburgh.

extending to 0.5 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 20 mm long; bracteoles lacking; tepals 2, deciduous in fruit, spreading, ovate, 5–14 × 5–15 mm, apex rounded, white, pink, or red, glabrous, margin entire, aciliate; ovary body ovoid, 3–13 × 2–6 mm, pale green, white, pink, or red, glabrous or rarely pilose, unequally 3-winged, wings semi-circular to triangular, largest 7–16 × 4–20 mm, smallest 3–14 × 1–6 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 4–6 mm long, once-divided, stigmatic papillae in a twice-spirally twisted band. *Fruiting pedicel* to 28 mm long. *Fruit body* ovoid, to 18 × 9 mm, drying brown, wings same shape as in ovary, the largest expanding to 25 × 20 mm, the smallest to 18 × 9 mm.

**Proposed conservation assessment**

Widespread and abundant throughout its range, and frequently found in secondary forest, forest edges, and heavily disturbed areas. Its EOO is > 21 500 km$^2$ and includes several protected areas. We assess *B. bracteosa* as Least Concern (LC), which replaces the DD assessments of *B. tribracteata* Irmsch. and *B. subciliata* var. *persicina* Irmsch. (León & Monsalve 2006).

**Notes**

The specimens we recognise here as *B. bracteosa* form a complex that includes the types of seven separate basionyms and several combinations of these basionyms. Plants in this complex are extremely common from Huánuco Pasco to Cusco Regions and are present but less abundant within San Martín and Puno Regions, and La Paz Department in Bolivia. All specimens from this complex are similar in that they are succulent, upright herbs with large, deciduous stipules; transversely ovate leaves; large inflorescences with > 20 staminate and > 20 pistillate flowers; staminate and pistillate flowers both with 2 tepals; pistillate flowers that lack bracteoles and have twice-spirally twisted styles; and staminate flowers with 20–50 stamens. They differ however in their indumentum; the size, texture, colour, and margins of their leaves; the size and colour of their flowers; the shape and size of their fruits; and how succulent or woody their stems are.

Within this complex, the variation in these characters is largely, but not completely, geographically structured. For example, specimens from Pasco and Junín Regions tend to have the largest leaves with the smoothest texture while specimens from Ayacucho and Cusco Regions tend to have the thickest, woodiest stems and smallest leaves. Characters also vary, however, between plants in the sun and shade, or among plants across the species' elevational range. Furthermore, we can find no consistent breaks in any of these characters nor links between any character states. We therefore synonymise all six basionyms and their combinations with *B. bracteosa*.

Alphonse Pyramus de Candolle described *B. bracteosa* and *B. subciliata* A.DC. on the same page (de Candolle 1859: 132) and distinguished them based upon their leaf margins (crenate and ciliate in *B. bracteosa*; undulate to crenate in *B. subciliata*); and their stipule shape and deciduousness (ovate and deciduous in *B. bracteosa*; elliptic and late-deciduous in *B. subciliata*). The two species were also distinguished by the presence of ciliate, bracteoles in *B. bracteosa*. This was however a misinterpretation of the type specimen, which contains no bracteoles but ciliate bracts. This mistake was corrected by Irmscher (1949: 586) who maintained *B. bracteosa* and *B. subciliata* as separate species, separating them by their leaf margins and texture, the shape of their fruit wings, and the shape of their stipule apex. These characters are not consistent, so we treat these two species as the same taxon. Priority for names published in the same publication is established based on the first designation as either name as accepted. This has not occurred with respect to *B. bracteosa* or *B. subciliata*, so we select the former as the accepted name because *B. subciliata* has previously been treated as a synonym of *B. cyathophora* (Smith & Schubert 1941a).

*Begonia roezlii* Regel was described by Eduard August von Regel from material grown from seed in the Saint Petersburg botanical garden (von Regel 1876: 194). The seeds were sent to Saint Petersburg by the distinguished orchid collector Benedict Roezl who collected them in Peru. Roezl's Peruvian travels included Chanchamayo Province and it is perhaps here that he encountered this species. Indeed, the type illustration designated shows a plant very similar in colouration to specimens we have collected in Chanchamayo (e.g., *P.M. Moonlight & A. Daza 34*). This illustration falls within our concept of *B. bracteosa*, so we synonymise this name herein.

Three years following Regel's description of *B. roezlii* Regel, Robert Irwin Lynch published *B. roezlii* Lynch, which is a later homonym (Lynch 1879: 566). In 1844, Joseph Dalton Hooker published a nom. nov. for this name as *B. lynchiana* Hook.f. (Hooker 1884). We have not been able to locate any type material of *B. roezlii* Lynch (see Typification notes below) and the description is not sufficient for identification, but illustrations of the original introduction clearly fit within our circumscription of *B. bracteosa* (Lynch 1883). We therefore synonymise both *B. roezlii* Lynch and *B. lynchiana* Hook.f. with *B. bracteosa*.

Irmscher (1949: 588) described *B. subciliata* var. *persicina* to encompass specimens of his concept of *B. subciliata* from Junín Region with unusually large inflorescences and flowers. These specimens were also unusual in that they have bright red flowers, which, to our knowledge, is only found in our concept of *B. bracteosa* in a small area of Junín Region. We have collected members of this species with particularly large and bright red flowers in this area (*P.W. Moonlight & A. Daza 36*). Most other specimens of this species from Junín and Pasco Region have equally large flowers so synonymise this variety with *B. bracteosa*.

Irmscher (1949: 589) described *B. tribracteata* to accommodate specimens that were otherwise similar to *B. subciliata* and *B. bracteosa* but had three bracteoles subtending the ovary. Irmscher described the bracteoles as unequal, with two large bracteoles (ca 3 × 2 mm) and one residual bracteole. Our examination of the types of this name revealed no bracteoles. Rather, the pistillate flowers are in bud and their subtending peduncle has not yet elongated. With a < 1 mm long peduncle, it appears as if the flower is subtended by a pair of bracteoles, but these are instead the bracts at the node below the flower. The third bract may be a misinterpretation of the inflorescence node itself. The types of *B. tribracteata* have unusually thick stems that appear woody but fall within our concept of *B. bracteosa*. We synonymise *B. tribracteata* with *B. bracteosa* herein.

Irmscher also described *B. suprafastigiata* Irmsch. in his revision of the begonias of South America (Irmscher 1949: 590). While he included it in *B.* sect. *Cyathocnemis*, he noted that it resembled members of *B.* sect. *Ruizopavonia* in its elongated stems and inflorescences. The type gathering was also noted to reach 3 m tall and climb through other vegetation. We have collected this at the type locality (*P.W. Moonlight & A. Daza 89*) and plants vary from relatively slender and elongated when growing through other plants to relatively robust when growing in the open. This is true of other populations in Cusco Region (e.g., *P.W. Moonlight & A. Daza 79*) and we do not consider these differences enough to separate species so we synonymise *B. suprafastigiata* with *B. bracteosa*.

**Typification notes**

Alphonse de Candolle cited material of *B. bracteosa* seen in "h. Hook." In the species' protologue (de Candolle 1859: 132). This citation is repeated in de Candolle's later revision of the Begoniaceae (de Candolle 1864: 331) and by Smith and Schubert in their Flora or Peru *Begonia* account (Smith & Schubert 1941a). Most of Hooker's herbarium is now incorporated in Kew herbarium. The only sheet in this herbarium that includes a determination by de Candolle is K000536745. This specimen has flowers

and a single fruit so we designate it as the lectotype of *B. bracteosa* herein. The origins of this specimen are unclear, and it may be impossible to determine from where in Peru it originates.

The protologue of *B. subciliata* cites material from Pavón's herbarium labelled as *"Begonia ciliata*" (de Candolle 1859: 132). Pavón's personal herbarium was bought by Edmond Boissier from the heirs of Pavón in 1844. Boissier's herbarium was held in Geneva and frequented by de Candolle, who described several species from the collection. It seems likely that the protologue was referring to material held by Boissier. De Candolle's later revision of the Begoniaceae (de Candolle 1864) cites material of *B. bracteosa* in the Boissier herbarium, which provides further support for this hypothesis. There are two sheets in G that were incorporated from the Boissier herbarium in 1944. Both sheets have minimalist labels suggestive of Pavón's personal herbarium. One of these (G) has a determination for *B. subciliata* in de Candolle's hand while the second has "*Begonia ciliata* del Peru" in Pavón's hand (G, F neg. 8518). Both are equally good material, and we chose the latter as a lectotype of *B. subciliata* herein because the F photograph means it has been used as a de facto type for many years. The lectotype of *B. subciliata* is without locality but Ruíz's diaries (Dahlgren 1940: 198) contain a reference to a description of "*B. ciliata*" written in Huánuco. The plant may have been collected in Huánuco or at any earlier point during their expedition. The expedition travelled extensively before this date so further clarity is difficult. An illustration in MA (MA-AJB04-D-1395) matching this material is also labelled as '*Begonia ciliata*', providing a direct link between a specimen and an illustration made during the expedition.

Any specimens that could be considered original material of *B. roezlii* Regel would most likely be housed in LE herbarium, but we have been unable to locate these despite a thorough search by herbarium staff. The protologue however includes an excellent illustration of the species (von Regel 1876: 194) so, as it is the only known original material used by Regel, we designate the illustration of *B. roezlii* as the lectotype of this name herein.

*Begonia roezlii* Lynch was described from plants sent to Lynch by M. Benary of Erfurt and Rev. Law of Sheffield. These plants were grown from seed sent by Roezl, though Lynch wrote that the seeds originated in Mexico (Lynch 1879: 566). The original description of this plant is valid but not sufficient for identification. Fortunately, Lynch (1883) later published a short article in *The Garden* to advertise the species, which was accompanied by an excellent illustration. This illustration clearly fits into our circumscription of *B. bracteosa* and it is extremely unlikely that the seed originated in Mexico as *B. bracteosa* is only found in Peru and Bolivia and *B.* sect. *Cyathocnemis* is endemic to South America (Moonlight *et al.* 2018). Roezl collected both in Mexico and Peru in 1873 so it seems likely the seeds were mislabelled. We have been unable to locate any specimens that could be considered original material of *B. roezlii* Lynch. If these existed, they would most likely be deposited in CGE, but a thorough search of the herbarium failed to uncover any such specimens. We therefore designate the illustration of *B. roezlii* in Lynch's later article (Lynch 1883) as the neotype of this species herein. This also serves as the neotype of Joseph Dalton Hooker's 1884 nom. nov. of *B. roezlii*, *B. lynchiana* Hook.f.

The protologue of *B. subciliata* var. *persicina* includes reference to material of *E.P. Killip & A.C. Smith 25613* and *26118* held in US and F herbaria, respectively (Irmscher 1949: 588). It is therefore appropriate to designate a lectotype from these duplicates. The material of *E.P. Killip & A.C. Smith 25613* at US (US00115461) is in flower; thus, we designate it the lectotype of *B. subciliata* var. *persicina* herein. The protologue of *B. tribracteata* cites material of *E.P. Killip & A.C. Smith 22326* In F and US herbaria thus it is appropriate to designate a lectotype. The duplicate in US (US00115474) includes only a small section of a branch with a leaf and a detached inflorescence. The duplicate in F is much more complete, including two branches, a full infructescence, and staminate flowers. We therefore designate the duplicate in F (V0042332F) as the lectotype of *B. tribracteata* herin. Irmscher cited duplicates of *A. Weberbauer 7907* in B and F herbaria in the protologue of *B. suprafastigiata* (Irmscher 1949: 590). The

material held in Berlin has flowers and fruits whereas the duplicate in Chicago is sterile. We therefore designate the duplicate in B (B100243054) as the lectotype of *B. suprafastigiata* herin.

### Identification notes

There are more than ten large (> 50 cm tall) species of Peruvian *Begonia* with an upright stem and transversely ovate leaves that lack lobes but, of these, *B. bracteosa* is by far the most common and widespread. It can therefore be treated as the default name for any such *Begonia* in Peru, as long as specimens do not have any of the following characters: a tuber (see *B. piurensis*); bracteoles or > 2 tepals in the pistillate flower (see *B.* sect. *Hydristyles* and the stenotepala group of *B.* sect. *Cyathocnemis*); multifid styles (see *B.* sect. *Hydristyles*); < 20 flowers in an inflorescence (see *B. longinqua* Moonlight sp. nov.); bracts fused into a cyathium (see *B. cyathophora*); or aciliate leaf margins (various species of *B.* sect. *Cyathocnemis* or *B.* sect. *Hydristyles*).

### Distribution and ecology

Known from Peru and northern Bolivia. Within Peru, collected in San Martín, Huánuco, Ucayali, Pasco, Junín, Ayacucho, Cusco, and Puno Regions (Fig. 24B). Found in lower, middle, and upper Montane Forests and rarely Amazonian Forest at elevations from 600 to 2900 m a.s.l. *Begonia bracteosa* is usually found on the edges of montane forest or on cliffs and banks, including in disturbed areas. Like other members of *B.* sect. *Cyathocnemis*, the species flowers throughout the year but most frequently from June to November.

## 11. ***Begonia cyathophora*** Poepp. & Endl.
Figs 24C, 28

*Nova Genera ac Species Plantarum* 1: 7 (Poeppig & Endlicher 1835). – **Type**: PERU – **[Huánuco Region: Prov. Huánuco]** • Andium ad Cuchero; [9°30′ S, 75°56′ W]; Jul. 1829; *E.F. Poeppig s.n.*; lectotype: W [W0047372, F neg. 20861], **designated here** • "in Peruviae nemoribus", *H. Ruiz & J.A. Pavón s.n.*; epitype: B [B100242144], **designated here**. – **[Huánuco Region: Prov. Huánuco]** • Cuchero; [9°30′ S, 75°56′ W]; 1830; *E.F. Poeppig 1062*; syntype: W [W0047373] • ibid.; 1829; *E.F. Poeppig 1062*; syntype: W [W18890111344] • ibid.; 1830; *E.F. Poeppig 1063*; syntype: W [2: W0047374, W0047375].

de Candolle (1864: 333); Smith & Schubert (1941a: 186); Irmscher (1949: 603); Brako & Zarucchi (1993: 191).

*Cyathocnemis obliqua* Klotzsch (nom. illeg.; nom. superfl.), *Gattungen und Arten* 1854: 247 (Klotzsch 1855). – **Type**: PERU • "in Peruviae nemoribus", *H. Ruiz & J.A. Pavón s.n.*; lectotype: B [B100242144], **designated here**. – **[Huánuco Region: Prov. Huánuco]** • Andium ad Cuchero; [9°30′ S, 75°56′ W]; Jul. 1829; *E.F. Poeppig s.n.*; syntype: W [W0047372, F neg. 20861]. – **[Huánuco Region: Prov. Huánuco]** • Cuchero; [9°30′ S, 75°56′ W]; 1830; *E.F. Poeppig 1062*; syntype: W [W0047373] • ibid.; 1829; *E.F. Poeppig 1062*; syntype: W [W18890111344] • ibid.; 1830; *E.F. Poeppig 1063*; syntypes: W [2: W0047374, W0047375].

Walpers (1858: 919); de Candolle (1864: 333).

*Begonia obliqua* Ruiz ex Klotzsch (nom. inval.; nom. rej. pro syn. *Cyathocnemis obliqua* Klotzsch (nom. illeg.; nom. superfl.)), *Gattungen und Arten* 1854: 247 (Klotzsch 1855).

### Etymology

The name derives from the Latin '*cyathium*' and '*phora*' meaning 'cyathium bearing'. This refers to the distinctive fused pair of bracts that surround the first inflorescence node.

**Specimens examined**

PERU • *H. Ruiz & J.A. Pavón 167*; G • ibid.; *H. Ruiz & J.A. Pavón 152*; G, mounted on the same sheet as *H. Ruiz & J.A. Pavón 320* • ibid.; *H. Ruiz & J.A. Pavón 320*; G, mounted on the same sheet as *H. Ruiz & J.A. Pavón 152* • ibid.; *H. Ruiz & J.A. Pavón s.n.*; G-BOIS • ibid.; *H. Ruiz & J.A. Pavón s.n.*; G-BOIS • ibid.; *H. Ruiz & J.A. Pavón s.n.*; MA • ibid.; *H. Ruiz & J.A. Pavón s.n.*; OXF [mixed collection] • ibid.; *H. Ruiz & J.A. Pavón s.n.*; G-DC ex G-BOIS • ibid.; *H. Ruiz & J.A. Pavón s.n.*; US [US00222066] • ibid.; *R. Pearce 180*; K [K000374269]. – **Huánuco Region: Prov. Huánuco** • Camino a río Monzón cerca a Tingo María; [9°19′ S, 76°01′ W]; 700 m a.s.l.; 21 Jun. 1953; *R. Ferreyra 9304*; US [US00222056], USM • Huacachi, estación near Muña; [9°40′ S, 75°49′ W]; 23 May 1923; *J.F. MacBride 3877*; B, F.

**Description**

Caulescent herb, to at least 50 cm high. *Stem* erect, rarely branching; internodes to 6 cm long, to 7 mm thick, succulent, colour unknown, glabrous. *Stipules* deciduous, broadly obovate, 22–25 × 15–30 mm, apex rounded, opaque, colour unknown, glabrous, margin entire, aciliate. *Leaves* > 3 per stem, alternate, basifixed; petiole 3–9 cm long unknown, colour unknown, glabrous; blade asymmetric, transversely ovate, to 13.5 × 9.5 cm, succulent, apex short-acuminate, base transversely cordate, basal lobes overlapping, sinus to 35 mm deep, margin crenate, aciliate, upper surface colour green, glabrous, lower surface pale green, glabrous, veins palmate but with one primary vein, 7–10 veined from the base, with 1–3 secondary veins on the larger side, 1–2 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with at least 2 branches but the second branch onwards reduced to appear umbellate, bearing up to 32 staminate flowers and 16 pistillate flowers, protandrous; peduncle to 18 cm long, colour unknown, indumentum glabrous, bracts persistent, the first pair of bracts fused into an obconicular cyathium, 22–24 × 18–23 mm, opaque, colour unknown, glabrous, apex truncate, margin entire, aciliate, subsequent bracts broadly ovate, 8–10 × 8–15 mm, opaque, colour unknown, apex rounded, margin entire, aciliate. *Staminate flowers*: pedicels to 35 mm long, glabrous; tepals 2, spreading, broadly ovate, 5–6 × 6–10 mm, apex rounded, colour unknown, glabrous, margin entire, aciliate; stamens ca 25, spreading, yellow, filaments 0.5–1.5 mm long, free, anthers ellipsoid, 1.5–2 × 0.3 mm, dehiscing via lateral slits, connectives extending to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 8.5 mm long; bracteoles lacking; tepals 2, equal, deciduous in fruit, broadly ovate, 4–6 × 6–7.5 mm, apex rounded, colour unknown, glabrous, margin entire, aciliate; ovary body ovoid, ca 4 × 1.5–2.5 mm, colour unknown, glabrous, unequally 3-winged, wings triangular, largest ca 5.5 × 4 mm, smallest ca 3.5 × 2.5 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2.5–4 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 21 mm long. *Fruit body* ovoid, to 10 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding to 19 × 20 mm, the smallest expanding to 14 × 5 mm.

**Proposed conservation assessment**

A rarely collected species with a very restricted range, demonstrated by its EOO of < 50 km$^2$. This species has never been collected at elevations exceeding 1000 m a.s.l. and little original forest remains below this elevation across its range. This may explain why it was frequently collected before the 1830s but only twice since and never since 1953, even though it grows in some of the best collected areas of Peru. We were unable to locate *B. cyathophora* during fieldwork in 2016. We assess *B. cyathophora* as Critically Endangered (CR B1ab(iii)+B2ab(iii)).

**Typification notes**

Eduard Friedrich Poeppig and Stephan Endlicher described *B. cyathophora* from material they collected in Cuchero in the Huánuco Region of Peru (Poeppig & Endlicher 1835: 7). There are four sheets that match this description housed in Vienna (W) herbarium. We designate *E.F. Poeppig s.n.* collected in July


**Fig. 28.** *Begonia cyathophora* Poepp. & Endl., habit. **a**. Staminate flower, side front. **b**. Tepals of the staminate flower. **c** Androecium, side view. **d**. Pistillate flower, side view. **e**. Tepals of the pistillate flower. **f**. Developing fruit, side view. **g**. Fruit, side view. **h**. Mature fruit, side view. **i**. Seeds. Illustration by Isidro Gálvez from material collected by H. Ruiz & J.A. Pavón during their Peruvian expedition. Reproduced with the permission of MA herbarium (MA-AJB04-D-1396), where it is filed as *Begonia utricularia*.

1829 (W0049372) as the lectotype herein because it is a superior collection and its label states it was once held in Poeppig's personal herbarium. This specimen lacks flowers, so it is appropriate to designate an epitype that matches the Poeppig collections. This material is characterised by the extremely large and persistent stipules, which are free and paired but overlap to such an extent that they were described by Smith & Schubert (1941a) as simulating a complete cyathium. This character is also found on several specimens collected by Ruiz and Pavón. Their expedition collected extensively around Cuchero, so this material likely originated from the same population as Poeppig's. We designate one such fertile specimen housed in Berlin (B100242144) as the epitype for *B. cyathophora*.

Twenty years after the publication of *B. cyathophora*, Klotzsch described the genus *Cyathocnemis* Klotzsch. The only species included was *C. obliqua*, and in its protologue Klotzsch cited *B. cyathophora* as a synonym (Klotzsch 1855: 247). Klotzsch also cited Poeppig's collections of *B. cyathophora* in his protologue of *C. obliqua* and for both these reasons *C. obliqua* is a superfluous name and a synonym of *B. cyathophora*. As discussed above, Poeppig's material lacks flowers so is not an ideal lectotype. Klotzsch also cited "*Begonia obliqua* Herb. Ruizii" and specimens collected by Ruiz and Pavón. There are many Ruiz and Pavón specimens of *B. cyathophora* in European herbaria, but the only one we can be sure he saw is housed in Berlin (B100242144). This specimen is fertile and a good candidate for a lectotype, so we designate it as the lectotype of *C. obliqua* Klotzsch herein. We also designate it as the epitype of *B. cyathophora* (see above) so emphasises that *C. obliqua* is a superfluous name of *B. cyathophora*.

**Synonymy notes**

Much of Ruiz and Pavón's material was distributed as "*Begonia obliqua* del Peru" or "*Begonia* sp. nov." but it appears that they intended to publish this material as *B. utricularia*. This name is found on a specimen housed in Madrid (MA813505) and an unpublished illustration by I. Gálvez housed in Madrid (MA-AJB04-D-1396). Ruíz's diaries clarify that the description for *B. utricularia* was made in Muña (Dahlgren 1940: 212). Muña is < 25 km from Cuchero, which further supports the conclusion that the material collected by Ruiz and Pavón originates from the same population as Poeppig's type material.

**Identification notes**

*Begonia cyathophora* is most similar to *B. bracteosa*. It is best distinguished when with a young inflorescence, as the two bracts that surround the first inflorescence node fuse to form a characteristic obconicular cyathium. Following the second inflorescence node, subsequent internodes are reduced such that the inflorescence appears to be composed of two umbels. When sterile, *B. cyathophora* can also be distinguished by its aciliate leaf margins (vs ciliate) and its stipules, which are at least two thirds as broad as long and often broader than long, vs twice as long as broad in *B. bracteosa*.

**Distribution and ecology**

Endemic to the Huánuco Region of Peru where it has been collected in lower montane forests at an elevation of ca 700 m a.s.l. (Fig. 24C).

12. ***Begonia imbrexiformis*** Moonlight sp. nov.
urn:lsid:ipni.org:names:77323288-1
Figs 24A, 29

**Diagnosis**

Most similar to *B. obtecticaulis* but differs in its straight, elliptic leaves that are cuneate at the base (vs lanceolate to ovate leaves with an obliquely cordate base) and have pinnate (vs palmate-pinnate) venation. It further differs in its denticulate (vs irregularly double-dentate) leaf margins; its stipules,

which are in uneven pairs and have an asymmetrical base, with the larger side auriculate (vs with a symmetrical base, both sides cuneate); its smaller tepals on the staminate flowers (5–11 × 5–10 mm vs 12–14 × 12–15 mm); and its more numerous stamens (ca 35 vs 25–30).

### Etymology

The species' epithet derives from the Latin noun '*imbrex*', which refers to a semi-cylindrical roofing tile. This derives from the species' long, red-brown stipules, which clasp the stem and overlap each other up the length of stem. These are reminiscent of the roofing tiles which give the city of Cuzco its distinctive terracotta colour.

### Type

PERU – **Cusco Region: Prov. Calca** • Dist. Yanatile, camino hacia Lacco Yavero; 12°15′ S, 72°18′ W; 1567 m a.s.l.; 27 Feb. 2005; *L. Valenzuela, E. Suclli & J. Farfán 5315*; holotype: MO [MO-1838287].

### Description

Caulescent herb, to 0.3 m high. *Stem* erect, rarely branching; internodes to 6 cm long, to 4 mm thick, succulent, red, glabrous. *Stipules* in unequal pairs, persistent, lanceolate, clasping the stem, 11–35 × 4–10 mm, apex obtuse, base asymmetrical, auriculate on the broad side, cuneate on the narrow side, translucent, pale brown, glabrous, margin entire, aciliate. *Leaves* > 5 per stem, alternate, basifixed; petiole 0.8–1.4 cm long, red, glabrous; blade asymmetric, elliptic, to 6.5 × 2.2 cm, succulent, apex acuminate, base obliquely cuneate, rarely truncate on the larger side of the lamina, margin denticulate, ciliate, upper surface green, glabrous, lower surface pale grey-green, glabrous, veins pinnate, with 6–8 secondary veins on the larger side, 4–7 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 2 branches, bearing up to 4 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 3 cm long, red, glabrous, bracts deciduous, lanceolate to ovate, 3–5 × 1–3 mm, translucent, colour unknown, glabrous, apex rounded to truncate, margin entire to irregularly serrate, aciliate. *Staminate flowers*: pedicels to 12 mm long, glabrous; tepals 2, spreading, broadly ovate, 5–11 × 5–10 mm, apex obtuse, pink, glabrous, margin entire, aciliate; stamens ca 35, spreading, yellow, filaments 1–2.5 mm long, free, anthers ellipsoid, 1.2–1.5 × 0.5 mm, dehiscing via lateral slits, connectives extending to 0.4 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 8 mm long; bracteoles 2, positioned directly beneath the ovary, lanceolate, ca 2 × 0.5 mm, apex acute, margin entire, translucent, glabrous, colour unknown; tepals unknown; ovary body narrowly ovoid, 4–7 × 2 mm, colour unknown, glabrous, unequally 3-winged, wings triangular, largest ca 8 × 8 mm, smallest 6–7 × 2–3 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 3 mm long, irregularly 2–5 times-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 14 mm long. *Fruit body* ovoid, to 11 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding to 12 × 12 mm, the smallest expanding to 11 × 3 mm.

### Proposed conservation assessment

Known from a single specimen in a poorly explored part of the Santuario Nacional de Megantoni protected area in Cusco Region, Peru. No information is known about the species' population size or trends in its population. We assess *B. imbrexiformis* sp. nov. as Vulnerable (VU D2).

### Notes

The large, clasping stipules of *B. imbrexiformis* sp. nov. are very unusual within *Begonia*. They are shared with *B. obtecticaulis*, which is likely closely related, and similar to those found in *B. venosa* Skan ex Hook.f. and *B. curtii* L.B.Sm. & B.G.Schub., which are distantly related members of *B.* sect. *Pritzelia* found in the Mata Atlantica of southeast Brazil. All three of these species live in relatively seasonal habitats. For example, *B. obtecticaulis*, lives in small patches of montane forest surrounded by

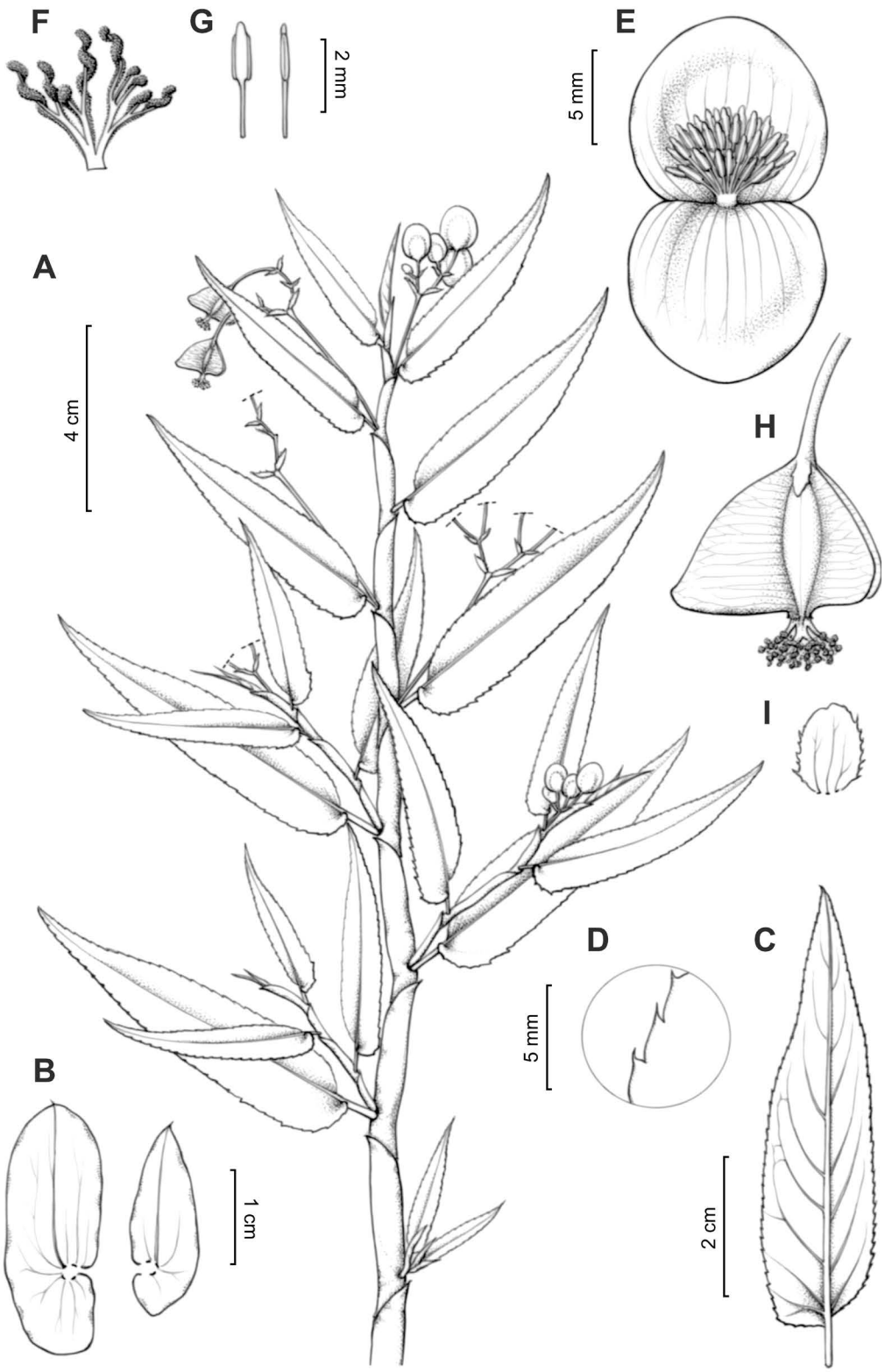


**Fig. 29.** *Begonia imbrexiformis* Moonlight sp. nov. **A**. Habit. **B**. Unequal pair of stipules. **C**. Leaf, abaxial surface. **D**. Close up of leaf margin. **E**. Staminate flower, front view. **F**. Gynoecium, side view. **G**. Stamen, front and side view. **H**. Fruit, side view. **I**. Bract. Illustration by Claire Banks from *L. Valenzuela, E. Suclli & J. Farfán 5313* (MO).

grassland. The clasping stipules may be adapted to prevent water loss during dry periods. The stipules of the newly described species are however unique both in coming in unequal pairs and in having an asymmetrical base. We know of no other cases of unequal, asymmetrical stipules in South American *Begonia*, but this is found in Asian *Begonia* such as *B. hughesii* R.Rubite & C.-I Peng (Rubite *et al.* 2015).

The sectional placement of *B. imbrexiformis* sp. nov. is unclear and it falls between the current circumscriptions of *B.* sects. *Cyathocnemis*, *Hydristyles*, and *Ruizopavonia*. These sections were considered similar by Doorenbos *et al.* (1998) and their circumscriptions remained largely unchanged in the latest community-led revision of the sections of *Begonia* (Moonlight *et al.* 2018) Few species of these three sections have been included in molecular phylogenies and southern Andean species have been particularly poorly represented. The current circumscriptions are unlikely to survive intensive study by molecular phylogenetics. In most respects, *B. imbrexiformis* sp. nov. best resembles *B.* sect. *Cyathocnemis* but its pinnate venation is reminiscent of *B.* sect. *Ruizopavonia* while its multifid styles are more common in *B.* sect. *Hydristyles*. We tentatively place *B. imbrexiformis* sp. nov. in *B.* sect. *Cyathocnemis* and this placement is supported by its similarity to *B. obtecticaulis*, which was placed in *B.* sect. *Cyathocnemis* by molecular data (Moonlight *et al.* 2018).

### Identification notes

Other than *B. obtecticaulis* (see Diagnosis) it is unlikely that *B. imbrexiformis* sp. nov. will be confused with any other species of Peruvian *Begonia*. Its straight, pinnately nerved leaves are relatively uncommon among Peruvian begonias and are unique in combination with its large, persistent stipules that overlap each other up the length of the stem.

### Distribution and ecology

Endemic to Peru and Cusco Region (Fig. 24A). Found in middle montane forest at an elevation of 1567–2040 m a.s.l. *Begonia imbrexiformis* sp. nov. may be most common on the edge of montane forest patches in common with most of its relatives.

## 13. ***Begonia lamolina*** Moonlight

Figs 2E, 24D, 30

*Phytotaxa* 381 (1): 121 (Moonlight & Reynel 2018). – **Type**: PERU – **Amazonas Region: Prov. Bongará** • Dist. Yambrasbamba, road from Amazonas to Rioja; 5°41′52″ S, 77°48′35″ W; 2301 m a.s.l.; 31 Jan. 2016; *P.W. Moonlight & A. Daza 144*; holotype: MOL; isotype: E [E00934305].

### Etymology

This species was named for the staff at MOL herbarium of the Universidad Nacional Agraria La Molina in Lima. The staff of this institute and in particular Carlos Reynel and Aniceto Daza have supported much of the recent work in Peruvian *Begonia* taxonomy.

### Specimens examined

PERU – **Amazonas Region: Prov. Bongará** • Dist. Yambrasbamba, Road from Bagua to Rioja; 5°41′16″ S, 77°47′10″ S, 2075 m a.s.l.; 3 Jul. 2018; *P.W. Moonlight 1259*; E, USM • Dist. Yambrasbamba, Road from Amazonas to Rioja; 5°41′42″ S, 77°48′18″ W; 2261 m a.s.l.; 31 Jan. 2016; *P.W. Moonlight & A. Daza 146*; E [E00959584], MOL • Límites con el departamento de San Martín, adelante de El Progreso, inmediaciones de la Reserva Abra Patricia, borde de carretera y entrandopor las quebradas; 5°41′58″ S, 77°48′02″ W; 2231 m a.s.l.; 12 Feb. 2017; *A. Orejuela, M. Cueva & J. Castillo 2758*; USM. – **San Martín Region: Prov. Rioja** • Dist. Pardo Miguel, Road from Pedro Ruiz to Rioja. Km

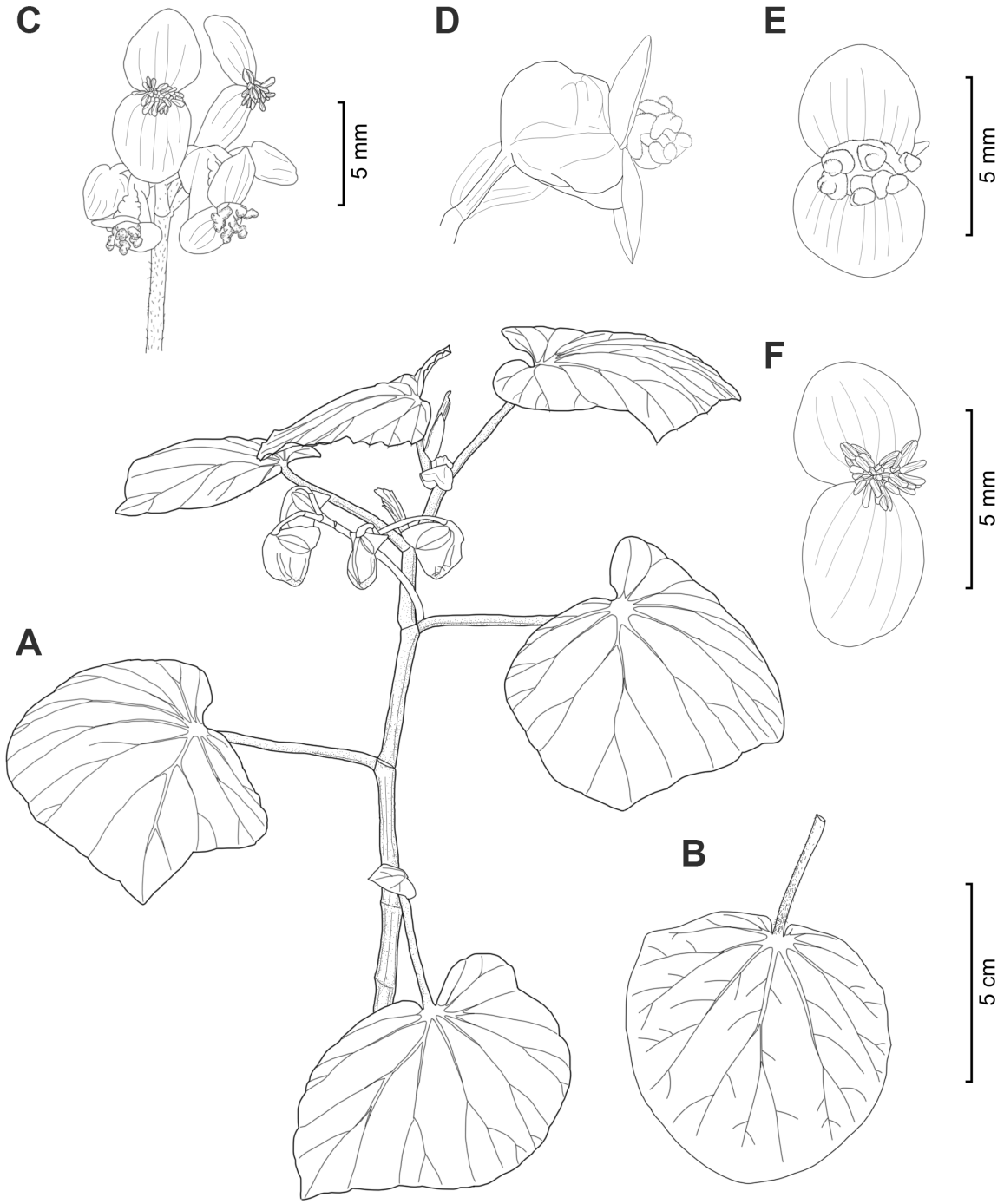


**Fig. 30.** *Begonia lamolina* Moonlight. **A**. Habit. **B**. Leaf, abaxial surface. **C**. Inflorescence. **D**. Pistillate flower, side view. **E**. Pistillate flower, front view. **F**. Staminate flower, front view. Illustration by Peter Moonlight from photographs of *P.W. Moonlight & A. Daza 146* (A) and *1142* (B–F); all scale bars estimated.

383, 5°39′49″ S, 77°45′10″ S, 4 Jul. 2018; *P.W. Moonlight 1268*; E, USM • Dist. Pardo Miguel, Path through chacre from km 182 of road from Pedro Ruiz to Rioja, ca 500 m from trail head; 5°40′01″ S, 77°45′13″ S; 1801 m a.s.l.; 4 Jul. 2018; *P.W. Moonlight 1266*; E, USM. – **Cultivated** • Grown in the Royal Botanic Garden Edinburgh from *P.W. Moonlight & A. Daza 146*, RBGE Living Accession 20180174; 5 Mar. 2018; *P.W. Moonlight 1142*; E.

**Description**

Caulescent herb, to 30 cm high. *Stem* erect, occasionally branching; internodes to 7.5 cm long, to 5 mm thick, succulent, green to red, glabrous to sparsely pilose. *Stipules* deciduous, lanceolate, 11–5 × 3–9 mm, apex acute translucent, light green, glabrous, margin entire, aciliate, base surrounded by pilose hairs. *Leaves* > 5, alternate, basifixed; petiole 2.5–8 cm long, green to pale, densely pilose; blade asymmetric, ovate, to 12 × 8.5 cm, subsucculent, apex obtuse to rounded, base cordate, basal lobes not overlapping, sinus to 7 mm deep, margin irregularly-dentate, ciliate, upper surface green with red veins, glabrous to densely pilose, lower surface pale green, sparsely to densely pilose, veins palmate but with 1 primary vein, 7–9 veined from the base, with 1–3 primary veins on the larger side, 1–2 on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with 4 branches, bearing up to 8 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 6.5 cm long, green to red, sparsely pilose, bracts deciduous, lanceolate, ca 4 × 2 mm, translucent, white, glabrous, apex acute, margin entre, aciliate. *Staminate flowers*: pedicels to 8 mm long, glabrous; tepals 2, spreading, ovate, ca 4 × 4 mm, apex rounded, white, glabrous, margin entire, aciliate; stamens 35–40, spreading, yellow, filaments 0.5–1 mm long, free, anthers linear, 1.5–2 × 0.4 mm, dehiscing via lateral slits, connectives extended to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 5 mm long; bracteoles 3, positioned directly beneath the ovary, ovate, 2–4 × 2–3 mm, apex rounded, translucent, white, glabrous, margin entire, aciliate; tepals 2, equal, deciduous in fruit, spreading, ovate, ca 8 × 4 mm, apex obtuse, white, glabrous, margin entire, aciliate; ovary body ovoid, ca 4 × 3 mm, pale green, glabrous, unequally 3-winged, wings triangular, the largest notched at the apex, 4 × 2 mm, the smallest 4 × 0.5 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2–2.5 mm long, once-divided, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 10 mm long. *Fruit body* ovoid, to 8 × 4 mm, drying brown, wings same shape as in ovary, the largest expanding to 12 × 12 mm, the smallest expanding to 8 × 7 mm.

**Proposed conservation assessment**

Recently assessed by Moonlight & Reynel (2018) as Data Deficient (DD).

**Identification notes**

*Begonia lamolina* is most likely to be confused with *B. lophoptera*. It differs in its deciduous, lanceolate stipules (vs persistent, reniform to ovate stipules), acuspidate leaves (vs cuspidate leaves), and its glabrous tepals on both the staminate and pistillate flowers (vs pilose on the outer surface of the tepals in both the staminate and pistillate flowers).

**Distribution and ecology**

Endemic to Peru and known from Amazonas and San Martín Regions (Fig. 24D). Found within middle montane forest at an elevation of 1800–2260 m a.s.l. *Begonia lamolina* is typically found at low densities in the understory of dense, humid montane forest but has also been collected on more exposed banks (e.g., *P.W. Moonlight 1268*). It has been collected in flower and fruit from January to July.

14. ***Begonia lophoptera*** Rolfe
Figs 24D, 31

*Bulletin of Miscellaneous Information, Kew* 1914 (1): 28 (Rolfe 1914). – **Type**: PERU – **Pasco Region: Prov. Oxapampa** • Pozuzo; [10°04′ S, 75°33′ W]; *R. Pearce 556*; lectotype: K [K000536718], designated by Moonlight & Reynel (2018: 122).

Smith & Schubert (1941a: 193); Brako & Zarucchi (1993: 193); Wasshausen *et al.* (2014: 385); Vásquez *et al.* (2005: 112–125).

**Etymology**

The name derives from the Greek '*lophos*' and '*pteron*', meaning 'crested' and 'wing' respectively. This refers to the largest wing of the ovary and fruit of the species, which we refer as notched at the apex, also resembles a crest.

**Selected specimens examined**

PERU – **Amazonas Region: Prov. Bagua** • Dist. Yambrasbamba, Área de Conservación Privada Bosque Berlín, cerca Santa Clara, trilha das cascadas; 5°54′08″ S, 78°24′55″ W; 2064 m a.s.l.; 5 Jul. 2018; *P.W. Moonlight 1275*; USM. – **Pasco Region: Prov. Oxapampa** • Dist. Chontabamba, Headwaters of río Tunqui, trail to Chuchurras-Palcazú; 10°14′ S, 75°28′ W; 1850 m a.s.l.; 2 Jan. 1984; *R.B. Foster, M. Chanco, J. Albán & D.N. Smith 7751*; MO [MO-1835888] • Dist. Huancabamba, Sector Oso Playa, camino hacia el campamento; 10°18′52″ S, 75°34′31″ W; 2478 m a.s.l.; 22 Oct. 2009; *L. Valenzuela, A. Monteagudo, M. Cueva, A. Peña, J. Mateo & R. Rivera 13875*; HOXA, E [E00934204], MO [MO-2991357], USM • Dist. Oxapampa, río San Alberto, abra Esperanza; 10°31′ S, 75°20′ W; 2400–2700 m a.s.l.; 28 Jun. 1985; *R.B. Foster, B. d'Achille & A. Brack 10289*; MOL, USM. – **Junín Region: Prov. Satipo**: route from Comas to Satipo, ca km 145; 11°30′07″ S, 75°51′48″ W; 2810 m a.s.l.; 13 Feb. 2016; *P.W. Moonlight & A. Daza 231*; MOL, E [E00885549] • Northern Cordillera Vilcabamba, eastern slope, upper río Poyeni watershed; 11°33′35″ S, 73°38′28″ W; 2050 m a.s.l.; 23 Jun. 1997; *B. Boyle, M. Arakaki & H. Beltrán 4570*; US [US00619624]. – **Ayacucho Region: Prov. La Mar** • Above Yuraccyacu on Cappichio-Punco trail, ca 40 km NE of Tambo, W slope of río Apurimac valley; 12°45′ S, 73°48′ W; 2516 m a.s.l.; 23 Jul. 1970; *M.T. Madison 10320-70*; US [US00222170] • Dist. Anco, camino de Chinquintirca a Toccate, altura de los km 206–207 del gaseoducto; [12°58′ S, 73°38′ W]; 2300–2400 m a.s.l.; 24 Mar. 2005; *J. Roque 4476*; USM. – **Madre de Dios Region: Prov. Manu** • Cerro de Pantiacolla, río Paltoa 10–15 km NNW of Shintuya, transect to ridgetop; 71°17′ W; 12°35′ S, 700–1300 m a.s.l.; 14 Dec. 1985; *R.B. Foster, R. Fernández & E. Vivar 10844*; USM. – **Madre de Dios-Cusco Region** • Road Puerto Maldonado-Urcos, between Quince Mil and Marcapata; [13°18′ S, 70°48′ W]; ca 800 m a.s.l.; 6 Oct. 1987; *F. Kahn & J.A. Llosa 2253*; NY. – **Cusco Region**: **Dist. Echarate** • Kapiromashi, 12°09′48″ S, 72°34′31″ W; 750 m a.s.l.; 26–30 Apr. 2004; *N. Salinas, H. Beltrán, R.B. Foster & C. Vriesendorm 6584*; USM. – **Prov. Calca** • Dist. Yanatile, Camino hacia Lacco Yavero; 12°15′ S, 72°18′ W; 1567 m a.s.l.; 27 Feb. 2005; *L. Valenzuela, E. Suclli & J. Farfán 5310*; MO [MO-2153566], US [US00932200] • Estrella, 12°26′50″ S, 72°30′05″ W; 1567 m a.s.l.; 20 Oct. 2005; *E. Suclli, C. Astete, A. Carazas & J. Torre 2592*; MO [MO-2184519], US [US00951219], USM. – **Prov. La Convención** • Cloud forest at camp 2 ½, damp Banks at Knox's Cascade, ca 2 km NW of camp 2 ½; [12°38′ S, 73°03′ W]; ca 1760 m a.s.l.; 29 Jul. 1968; *T.R. Dudley 10601*; US [US00222352] • Dist. Ocobamba, Versalles, Santa Elena; 12°46′29″ S, 72°17′08″ W; 1917 m a.s.l.; 20 Nov. 2007; *L. Valenzuela, C. Astete, F. Zamora, N. Suzres & M. Atausupa 10305*; MO [MO-2227977]); Dist. Santa Ana, "Quillabamba"; 12°50′04.5″ S, 72°47′20.8″ W; 2009 m a.s.l.; 16 Mar. 2017; *A. Orejuela, J. Castillo & M. Suarez 2861*; E [2: E00934206, E01053420], USM. – **Prov. Paucartambo** • 14 miles from Pilcopata along road to Cuzco, quebrada de Pillahuata; [13°02′ S, 71°30′ W]; 28 Nov. 1968; *B. Maguire & C. Maguire 61581*; MO [MO-2264391], NY, US [US00222176] • Dist. Kosñipata, Road from Paucartambo to Manu National Park; 13°05′ S, 71°33′ W; 1857 m a.s.l.; 13 Jan. 2015; *M.C. Tebbitt & A. Daza 821*; E [E01059316], MOL, USM • Dist.

Marcachea, Achirani; [13°33′ S, 70°36′ W]; 2700 m a.s.l.; 29 Jul. 1939; *J.C. Vargas Calderón 11113*; K. – **Prov. Quispicanchi** • Quincemil; [13°14′ S, 70°45′ W]; 730 m a.s.l.; 28 Feb. 1965; *J.C. Vargas Calderón 16063*; US [US00222177] • Community of Vitobamba, trocha Huarapascay; [13°18′ S, 70°49′ W]; 22 Mar. 2011; *J.D. Wells 763*; BRIT, USM • Dist. Maracapata, Between San Miquel (a small hamlet formerly known as San Pedro) and Puenti Capiri; 13°25′ S, 70°54′ W; 1294 m a.s.l.; 8 Jan. 2015; *M.C. Tebbitt & A. Daza 807*; E [E01059317], MOL.

### Description

Caulescent herb, to 100 cm high. *Stem* erect, occasionally branching; internodes to 8.5 cm long, to 8 mm thick, succulent, red, glabrous to sparsely pilose. *Stipules* persistent, reniform to ovate or rarely broadly lanceolate, 10–19 × 6–14 mm, apex rounded to acute, translucent, green, glabrous, margin entire, aciliate, base surrounded by pilose hairs. *Leaves* > 5, alternate, basifixed; petiole 1.5–9 cm long, red, sparsely to densely pilose; blade asymmetric, ovate, to 11 × 12 cm, succulent, apex acute to acuminate, base cordate, basal lobes not overlapping, sinus to 15 mm deep, margin irregularly double-dentate, with up to 4 cusps along the broad side of the lamina, ciliate, upper surface glaucous to vivid green, sometimes with red veins towards the petiole insertion, glabrous to densely pilose, lower surface pale green with red veins, sparsely to densely pilose, veins palmate but with 1 primary vein, 6–9 veined from the base, with 1–3 secondary veins on the larger side, 1–2 on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with up to 8 branches, bearing up to 16 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 8 cm long, red, sparsely to densely pilose, bracts deciduous, lanceolate, 7–25 × 5–7 mm, translucent, white, glabrous to sparsely pilose, apex acute, margin entire, aciliate to ciliate. *Staminate flowers*: pedicels to 15 mm long, sparsely to densely pilose; tepals 2, spreading, ovate, 6–19 × 6–17 mm, apex acute, white, pink, or red, inner surface glabrous, outer surface pilose, margin entire, aciliate; stamens 25–35, spreading, yellow, filaments 1.5–2 mm long, free, anthers linear, 0.5–1.5 × 0.5 mm, dehiscing via lateral slits, connectives extended to 0.5 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 12 mm long; bracteoles lacking; tepals 2, equal, deciduous in fruit, spreading, ovate, 11–21 × 4.5–17 mm, apex acute, white, pink or red, inner surface glabrous, outer surface pilose, margin entire, aciliate; ovary body ovoid, 4–6 × 2.5–3.5 mm, white, pink or red, sparsely pilose, unequally 3-winged, wings triangular, largest wing notched at the apex, 5–8 × 3.5–10 mm, smallest 5–8 × 1–4 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 3–5 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 25 mm long. *Fruit body* ovoid, to 11 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding 14 × 18 mm, the smallest expanding to 12 × 8 mm.

### Proposed conservation assessment

Recently assessed by Moonlight & Reynel (2018) as Least Concern (LC). A recent record from Bolivia (Moonlight & Fuentes 2022) increases its known EOO to > 189 000 km$^2$.

### Identification notes

*Begonia lophoptera* is very unusual in caulescent Andean begonias with palmate venation because its stems, petioles, and leaf laminae are usually sparsely to densely pilose (individual organs are rarely glabrous, but never the whole plant). It is also unusual among caulescent begonias in its cuspidate leaves. Identification of *B. lophoptera* can be confirmed by its notched fruit wings, which are only shared with the completely glabrous *B. lamolina*.

### Distribution and ecology

Known from Peru and Bolivia. Within Peru, found in Amazonas, Pasco, Junín, Ayacucho, Madre de Dios, and Cusco Regions (Fig. 24D). Found within lower, middle, and upper montane forests and rarely Amazonian forest at an elevation of 700–2700 m a.s.l. Most records are from Pasco and Cusco Regions

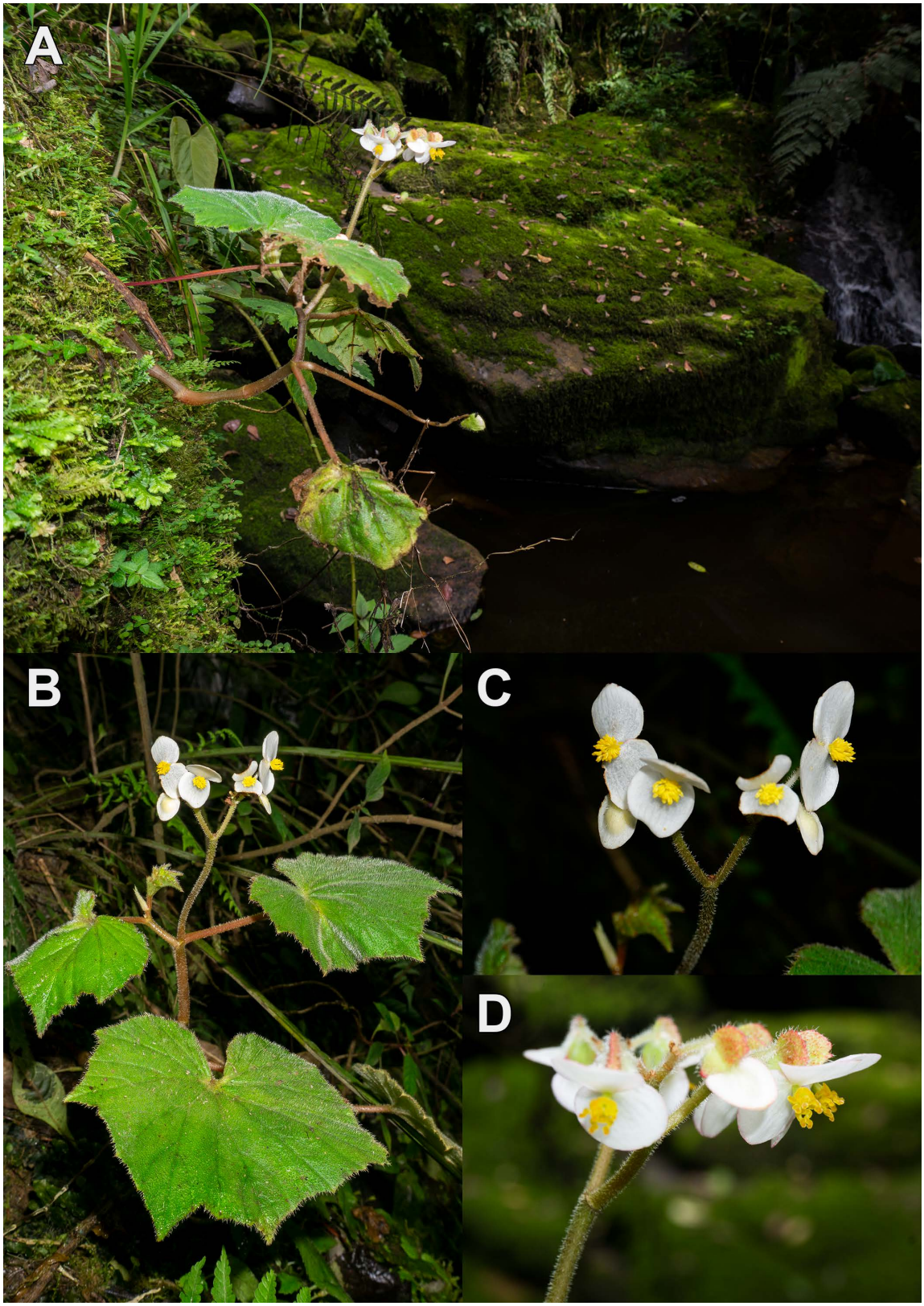


**Fig. 31.** *Begonia lophoptera* Rolfe. **A**. Habitat. **B**. Habit. **C**. Inflorescence, showing staminate flowers. **D**. Inflorescence, showing pistillate flowers. All photographs taken by P.W. Moonlight from *P.W. Moonlight 1274* (B, C) and *1275* (A, D) in Bagua Province, Amazon Region.

with the species only sparsely collected elsewhere, though this may reflect collection effort. Three recent records from a small population in Amazonas Region (*P.W. Moonlight 1273*, *1274*, *1275*) either represent a disjunct population, or suggest the range of *B. lophoptera* may be more continuous along the eastern slopes of the Andes than our data suggest. The species tends to be locally common around undisturbed, shaded water courses, and its nodding fruits suggest its seeds are drip dispersed.

15. ***Begonia longinqua*** Moonlight sp. nov.
urn:lsid:ipni.org:names:77323289-1
Fig. 32

**Diagnosis**

Most similar to *B. bracteosa* but differs in its persistent (vs deciduous) stipules; inflorescences that branch three times and bear up to twelve flowers (vs up to six times with > 20 flowers); its 8–14 (vs > 20) stamens; and the presence of a large, persistent bracteole at the base of the ovary and fruit (vs no bracteole).

**Etymology**

The name derives from the Latin '*longinquum*', meaning 'remote', and refers to the isolated nature of the species' two known populations.

**Type**

PERU – **Ucayali Region: Prov. Coronel Portillo •** Dist. Callaria, Cuenca del río Utiquinia, Cabecera de la quebrada Espejoyacu, afluente de la quebrada Manuela, Cerro Espajoyacu; 7°57.81′ S, 73°53.98′ W; 800 m a.s.l.; 7 Mar. 2003; *J.G. Graham 2390*; holotype: USM; isotypes: F [V0088041F], G, US [US01008545].

**Specimens examined**

COLOMBIA – **Dept. Caquetá •** Mun. Florencia, Vereda El Canelo, Finca Cataluña. Margen izquierdo del río Orteguaza. Fragmento de bosque (15 ha) en matriz de potreros; 1°29′58.7″ N, 75°31′16.6″ W; 330 m a.s.l.; 30 Jan. 2002; *C. Marín, M. Correa, J. Díaz & D. Caicedo 2485*; COAH.

**Description**

Caulescent herb, to 30 cm high. *Stem* erect, rarely branching; internodes to 6.5 cm long, to 5 mm thick, succulent, pale green, glabrous. *Stipules* persistent, lanceolate, 15–22 × 7–12 mm, apex acute to obtuse, translucent, pale green, glabrous, margin entire, aciliate. *Leaves* 3–5 per stem, alternate, basifixed; petiole 3–7 cm long, pale green flushed pink, glabrous; blade asymmetrical, ovate, to 13 × 9 cm, succulent, apex acuminate, base cordate, basal lobes not overlapping, sinus to 15 mm deep, margin entire to serrulate, sparsely long-ciliate, upper surface green, glabrous, lower surface pale green, glabrous, veins palmate but with one major vein, 8–10 veined from the base, with 1–2 veins on the broader side of the blade, 1–2 on the narrower side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with up to 2 branches, bearing up to 6 staminate flowers and 6 pistillate flowers, protandrous; peduncle to 12 cm long, pale green flushed pink, glabrous, bracts deciduous, ovate, ca 5 × 2 mm, translucent, colour unknown, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 14 mm long, glabrous; tepals 2, spreading, ovate, 10–12 × 8–13 mm, apex rounded, pink, glabrous, margin entire, aciliate; stamens 8–14, spreading, yellow, filaments 1–2 mm long, free, anthers elliptic, 1–2 × 0.5–0.8 mm long, dehiscing via lateral slits, connectives extended to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles 1, positioned directly beneath the ovary, lanceolate, 10–15 × 2.5–4 mm, apex rounded, translucent, colour unknown, glabrous, margin entire, ciliate; tepals 2, equal,

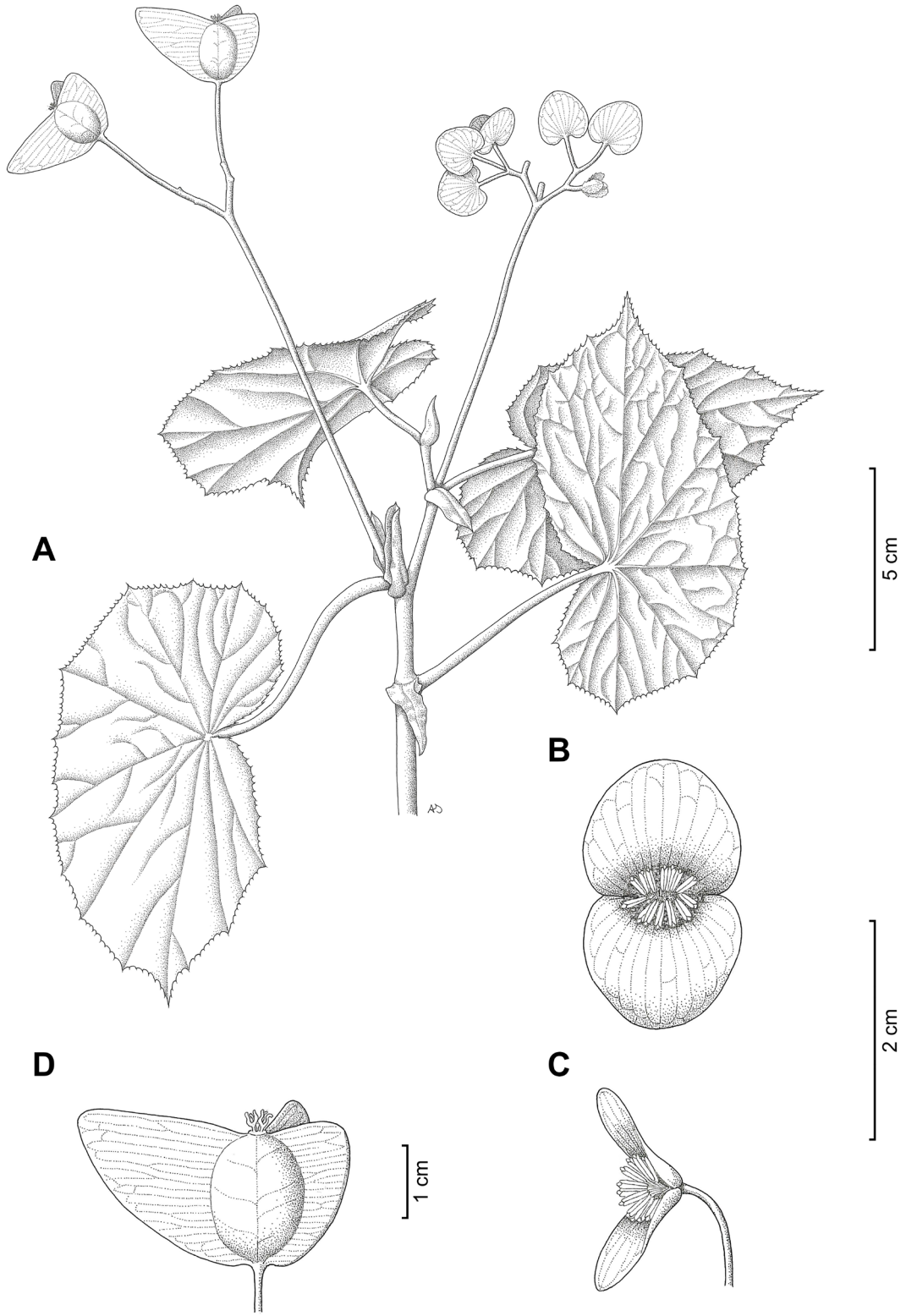


**Fig. 32.** *Begonia longinqua* Moonlight sp. nov. **A**. Habit. **B**. Staminate flower, front view. **C**. Staminate flower, side view. **D**. Fruit, side view. Illustration by Anna Dorward from *J.G. Graham 2390* (US).

deciduous in fruit, projecting, narrowly-ovate, 10–15 × 4–6 mm, apex obtuse, pink, glabrous, margin entire, aciliate; ovary body ovoid, 4–6 × 3–4 mm, colour unknown, glabrous, unequally 3-winged, the largest wing triangular, ascending, ca 9 × 5 mm, smallest marginal ca 1 mm wide; 3-locular, placentae unknown; styles 3, yellow, free, ca 4 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 23 mm long. *Fruit body* ovoid, to 13 × 10 mm, drying brown, the largest wing same shape as in ovary, expanding to 16 × 23 mm, the smallest expanding to an ascending triangular wing, to 16 × 10 mm.

**Proposed conservation assessment**

Known from two collections made ca 1000 km apart in Amazonian Peru and Colombia. The Colombian locality is largely deforested but the Peruvian locality is in an extremely remote part of the Amazon rainforest protected by Parque Nacional Sierra del Divisor. No information is known about the size of these populations, and it is unlikely the species is restricted to these two localities given the abundance of similar habitats on the margins of the Peruvian, Ecuadorian and Colombian Andes. We assess *B. longinqua* sp. nov. as Data Deficient (DD).

**Identification notes**

*Begonia longinqua* sp. nov. resembles a more compact, more succulent version of the widespread species *B. bracteosa*, to which it is almost certainly most closely related. It is easily recognised when in flower by its smaller, fewer branched inflorescences (branching 3 times vs up to 6 times) and its staminate flowers with 8–14 stamens (vs 20–50 stamens). It also differs in its persistent stipules.

**Distribution and ecology**

*Begonia longinqua* sp. nov. is known from two collections made ca 1000 km apart. The type collection was made at the summit of Cerro El Cono (also known as Cerro Espejoyacu) in the Sierra del Divisior in Loreto Province Peru (Fig. 24B). The second collection was made in Caquetá Department, Colombia, close to the town of Florencia. Both collection localities are on small hills that represent islands of lower montane forest surrounded by lowland Amazonian forest.

16. ***Begonia obtecticaulis*** Irmsch.
Figs 1D, 2C, 6E, 24D, 33

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74 (4): 600 (Irmscher 1949). – **Type**: PERU – **Huánuco Region** • Yanano; [9°51′ S, 75°49′ W]; ca 1828 m a.s.l.; 13–16 May 1923; *J.F. McBride 3721*; holotype: F [V0360598F].
Brako & Zarucchi (1993: 194); León & Monsalve (2006: 167).

**Etymology**

The epithet derives from the Latin words '*obtectus*' and '*caulis*', meaning 'hidden' and 'stem'. This refers to the large, persistent stipules that clasp the stem and hide it from view.

**Selected specimens examined**

PERU – **San Martín Region: Prov. Huallaga** • Valley of río Apisoncho, 30 km above Jucusbamba; 7°55′ S, 77°10′ W; 2600 m a.s.l.; 25 Aug. 1965; *A.C. Hamilton & P.M. Holligan 1421*; K, NY. – **Huánuco Region: Prov. Marañón** • route west of Uchiza; 8°36′29″ S, 76°40′42″ W; 1464 m a.s.l.; 9 Feb. 2016; *P.W. Moonlight & A. Daza 208*; E [E00885461], G, MO, MOL • ibid.; 8°38′43″ S, 76°48′55″ W; 2086 m a.s.l.; 9 Feb. 2016; *P.W. Moonlight & A. Daza* 212 (E [E00885463], MOL, P • Dist. Cholón, San

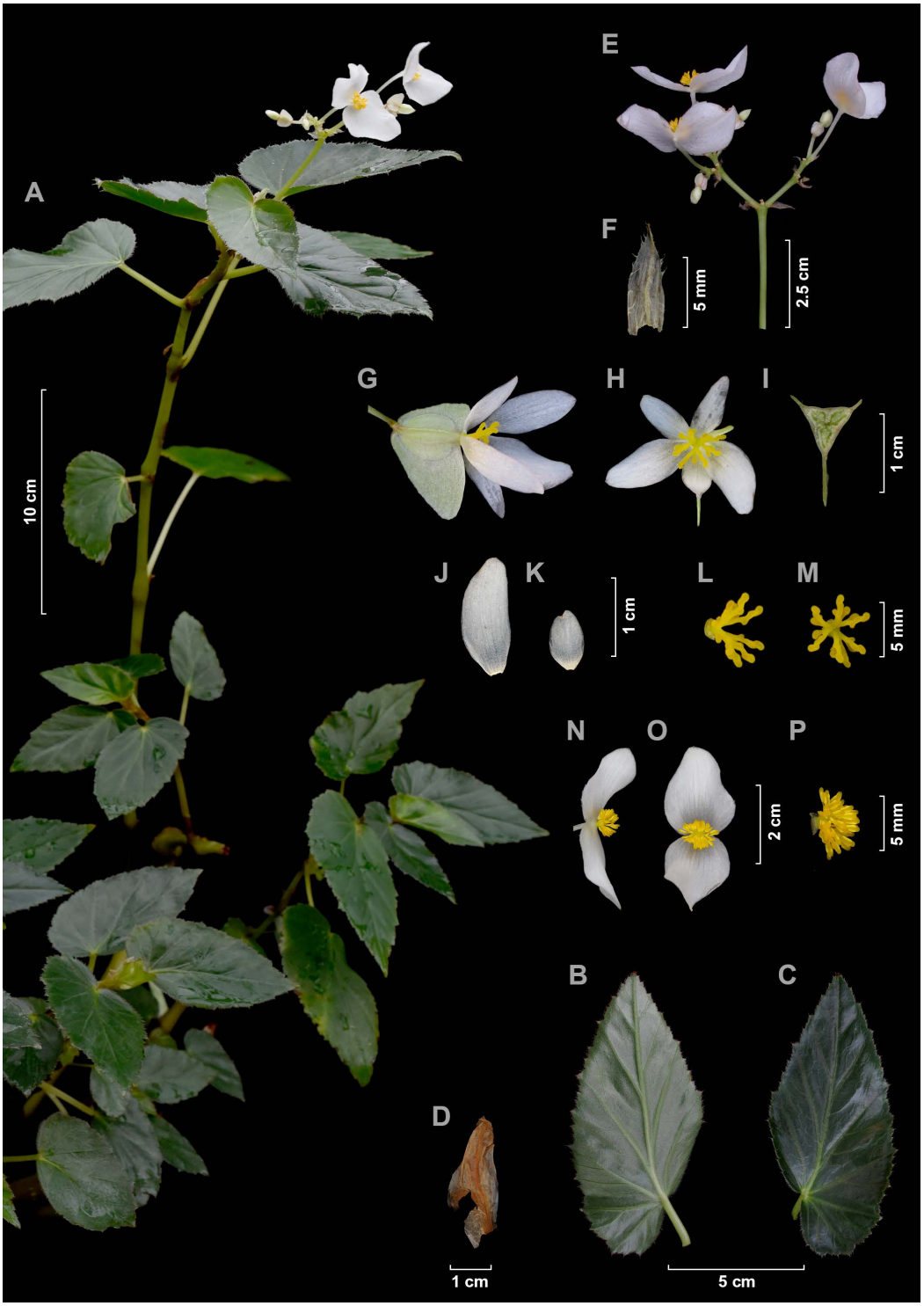


**Fig. 33.** *Begonia obtecticaulis* Irmsch. **A**. Habit. **B**. Leaf, abaxial surface. **C**. Leaf, adaxial surface. **D**. Stipule. **E**. Inflorescence. **F**. Bract. **G**. Pistillate flower, side view. **H**. Pistillate flower, front view. **I**. Cross section of ovary. **J**. Largest tepal of the pistillate flower. **K**. Smallest tepal of the pistillate flower. **L**. Pistils, side view. **M**. Pistils, front view. **N**. Staminate flower, side view. **O**. Staminate flower, front view. **P**. Androecium, side view. All photographs taken by D.A. Purvis in the living collections of the Royal Botanic Garden Edinburgh (Accession 20160137a, grown from seeds collected as part of *P.W. Moonlight & A. Daza 209*).

Pedro de Chonta, retorno desde el campamento hacia el pueblo San Pedro de Chonta; 8°38′13.42″ S, 76°53′08.57″ W; 3200 m a.s.l.; 21 Jul. 2021; *P. González & P. Arista 10016*; USM.

**Description**

Caulescent herb, to 1.5 m high. *Stem* erect, branching; internodes to 9.5 cm long, to 8 mm thick, succulent, pale green to dark red, glabrous. *Stipules* in unequal pairs, persistent, lanceolate to broadly ovate, clasping the stem, 9–35 × 4–18 mm, apex acute, base cuneate, translucent, pale green to brown, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 0.8–4.5 cm long, pale green to red, glabrous; blade asymmetric, lanceolate to ovate, to 9 × 3.5 cm, succulent, apex acuminate, base transversely cordate, basal lobes rounded, sinus to 6 mm deep, margin irregularly double-dentate, ciliate, upper surface bright green, glabrous, lower surface pale grey-green, glabrous, veins palmate-pinnate, 4–6 veined from the base, with 2–4 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 2 branches, bearing up to 4 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 8 cm long, red, glabrous, bracts persistent, lanceolate, 7–10 × 2–3 mm, translucent, white, glabrous, apex acuminate, margin lacerate, ciliate. *Staminate flowers*: pedicels to 12 mm long, glabrous; tepals 2, spreading, broadly ovate, 12–14 × 12–15 mm, apex obtuse, white to pink, glabrous, margin entire, aciliate or rarely ciliate at the base; stamens 25–30, spreading, yellow, filaments 1.5–3 mm long, free, anthers ellipsoid, 1.5–2 × 0.75 mm, dehiscing via lateral slits, connectives extending to 0.4 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 8 mm long; bracteoles 2, lanceolate to ovate, ca 1 × 0.5 mm, translucent, white tinged pink; tepals 5, subequal, deciduous in fruit, spreading, elliptic to ovate, 7–15 × 4–6 mm, apex rounded to acute, white, glabrous, margin entire, aciliate; ovary body ovoid, ca 7 × 6 mm, white, glabrous, unequally 3-winged, wings triangular, largest ca 10 × 10 mm, smallest ca 10 × 3 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 5 mm long, irregularly 2–5 times-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 18 mm long. *Fruit body* ovoid, to 9 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding 12 × 18 mm, the smallest expanding to 12 × 6 mm.

**Proposed conservation assessment**

Previously assessed by León & Monsalve (2006) as Endangered (EN); however, their concept of the species included specimens of *B. albomaculata* C.DC. Known from three populations, but the type locality has undergone severe deforestation in the last century and it was last collected there in 1923. Given its EOO of < 5000 km$^2$, that is known from three populations, and its probable extirpation from the type locality, we assess *B. obtecticaulis* as Endangered (EN B1ab(iv)).

**Notes**

Description of the pistillate flowers made using living accession 20160137a at the Royal Botanic Garden Edinburgh.

**Identification notes**

*Begonia obtecticaulis* is one of three Peruvian caulescent begonias with large, persistent stipules that clasp the internodes and are longer than the internodes. This character is shared with *B. inbrexiformis* and *B. serratistipula* sp. nov. *Begonia obtecticaulis* can be distinguished from *B. imbrexiformis* sp. nov. by its palmate-pinnate (vs pinnate) leaf venation and from *B. serratistipula* sp. nov. by the entire margins to its stipules (vs lacerate in the bottom third).

**Distribution and ecology**

Endemic to Peru and known from San Martín and Huánuco Regions (Fig. 24D). Found in lower, middle, and upper montane forest at an elevation of 1400–3200 m a.s.l. The species has most frequently been

collected on the margins of humid forests, particularly in areas of transition to drier Andean shrublands. There are only a few natural areas of dry shrubland in the Andes of San Martín and Huánuco Regions at the elevation favoured by *B. obtecticaulis* but some, such as Ongón District, remain poorly collected.

17. ***Begonia serratistipula*** Moonlight sp. nov.
urn:lsid:ipni.org:names:77323290-1
Fig. 24C

**Diagnosis**

Most similar to *B. cyathophora* but differing in its stipules, the bottom third of which have a lacerate margin (vs stipules with entire margins); its first pair of bracts free (vs fused into an obconicular cyathium); its staminate flowers with 6–10 stamens (vs ca 25); and its pistillate flowers with 2 bracteoles (vs lacking bracteoles).

**Etymology**

The species is named for its stipules, which have characteristic serrated margins.

**Type**

PERU – **Amazonas Region: Prov. Chachapoyas** • Dist. Leimebamba, camino a Monumentos Historicós de Pajatén; 6°34’23.76”S, 77°38’28.92”W; 1792 m a.s.l.; 29 Aug. 2004; *V. Quipuscoa S., M. Vílchez T. & W. Meza E. 3170*; holotype: HUT [HUT no. 44128].

**Description**

Caulescent herb, to 80 cm high. *Stem* erect, branching; internodes to 6.5 cm long, to 3 mm thick, succulent, green, glabrous. *Stipules* persistent, lanceolate to oblanceolate, 28–33 × 9–15 mm, apex acuminate, translucent, pale green flushed pink, glabrous, margin lacerate for the basal third, entire for the remainder, ciliate for the basal third then aciliate. *Leaves* > 5, alternate, basifixed; petiole 3–4.5 cm long, red, glabrous; blade asymmetrical, ovate, to 12 × 6.5 cm, succulent, apex acuminate, base obliquely cordate, basal lobes overlapping, sinus to 20 mm deep, margin irregularly double dentate, ciliate, upper surface dark green, glabrous, lower surface green flushed deep red, glabrous, veins palmate but with 1 major vein, 7–9 veined from the base, with 2–3 secondary veins on the larger side, 1–2 secondary veins on the smaller side. *Inflorescences* 1 or more per stem, bisexual, axillary, erect, cymose, with 3 branches, bearing up to 32 staminate flowers and 16 pistillate flowers, protandrous; peduncle to 10 cm long, dark red, glabrous, bracts deciduous, the first pair broadly obovate, ca 25 × 25 mm, translucent, pink, glabrous, apex truncate, margin entire to lacerate at the apex, ciliate, subsequent bracts lanceolate, 12–15 × 2–4 mm. *Staminate flowers*: pedicels to 10 mm long, glabrous; tepals 2, spreading, broadly ovate, 7–8 × 7–8 mm, apex obtuse to rounded, pink, glabrous, margin entire, aciliate; stamens 6–10, projecting, pale yellow, filaments 0.5–1 mm long, free, anthers elliptic, 1–1.5 × 0.2 mm long, dehiscing via lateral slits, connectives extending to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 17 mm long; bracteoles 2, positioned directly beneath the ovary, ellipsoid, ca 5 × 1.5 mm, apex acute, translucent, pink, glabrous, margin lacerate, ciliate; 2 equal tepals or 3 unequal tepals, deciduous in fruit, spreading, the largest two ovate to broadly ovate, 13–15 × 6–10 mm, apex obtuse to rounded, pink, glabrous, margin entire, aciliate, the smallest if present ovate, ca 12 × 5 mm, apex obtuse, pink, glabrous, margin entire, aciliate; ovary body ovoid, ca 8 × 5 mm, pink, glabrous, unequally 3-winged, wings triangular, largest ca 14 × 14 mm, smallest ca 10 × 3–4 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 3–4 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 20 mm long. *Fruit body* ovoid, to 11 × 7 mm, drying dark red then brown, wings same shape as in ovary, the largest expanding to 14 × 18 mm, the smallest expanding to 12 × 6 mm.

**Proposed conservation assessment**

Known only from a single population but nothing is known about the size of the species' population or trends in the species population. The type locality is very remote but is part of the drainage of the río Huayabamba. There has been significant, recent deforestation in this drainage in Amazonas Region, including within 2 km of the type locality. We assess *B. serratistipula* sp. nov. as Vulnerable (VU D2).

**Identification notes**

*Begonia serratistipula* sp. nov. is best distinguished from all other members of *B.* sect. *Cyathocnemis* by its stipules, which are entire towards the apex but uniquely lacerate and long ciliate towards the base. It may be confused with *B. cyathophora* but can further be distinguished by its ciliate (vs aciliate) leaf margins, or *B. obtecticaulis*, but differs in its bifid (vs multifid) styles and its stipules that do not clasp the stem.

**Distribution and ecology**

Endemic to Peru and Amazonas Region (Fig. 24C). Known from a single population in middle montane forest at an elevation of 1792 m a.s.l. Note that the type locality is a minor archaeological site known as Pajatén in Leimebamba District and not the famous site known as Gran Pajatén in Huicungo District, Mariscal Cáceres Province, San Martín Region but normally accessed from Chachapoyas Province in Amazonas Region (Church & Álvarez 2004). The ecology of this species is unknown, but it likely occurs at the edge of montane forest patches in common with most species in the section.

18. ***Begonia vargasii*** Moonlight sp. nov.
urn:lsid:ipni.org:names:77323291-1
Figs 24C, 34

**Diagnosis**

Most similar to *Begonia oblanceolata* Rusby but differing in its aciliate stipules and bracts (vs long-ciliate), the rounded to obtuse apices of the tepals of its staminate flowers (vs acuminate), its two bracteoles (vs one), its ovoid fruit body (vs obdeltoid), and its non-ascending fruit-wings (vs ascending).

**Etymology**

The species is named for the late Peruvian botanist Julio César Vargas Calderón, who collected the type specimen and is responsible for many of the unique or unusual collections of *Begonia* from Peru, particularly those from Cusco Region.

**Type**

PERU – **Cusco Region: Prov. Calca** • Mant'o, km 84; 12°59′ S, 72°04′ W; 2040 m a.s.l.; 19 Jun. 1964; *J.C. Vargas Calderón 15616*; holotype: US [US00222362].

**Description**

Caulescent herb, to at least 30 cm high. *Stem* erect, branching; internodes to 5.5 cm long, to 4 mm thick, succulent, colour unknown, glabrous. *Stipules* in unequal pairs, persistent, lanceolate to broadly ovate, clasping the stem, 10–32 × 4–6 mm, apex acute, base asymmetrical, auriculate on the broad side, cuneate on the narrow side, translucent, pale brown, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 0.8–2.2 cm long, colour unknown, glabrous; blade asymmetric, ovate, to 8 × 3.2 cm, succulent, apex acuminate, base transversely truncate, margin serrulate, ciliate, upper surface bright green, glabrous, lower surface pale grey-green, glabrous, veins palmate-pinnate, 4–6 veined from the base, with 2–4 secondary veins on the larger side, 1–3 secondary veins on the smaller side.

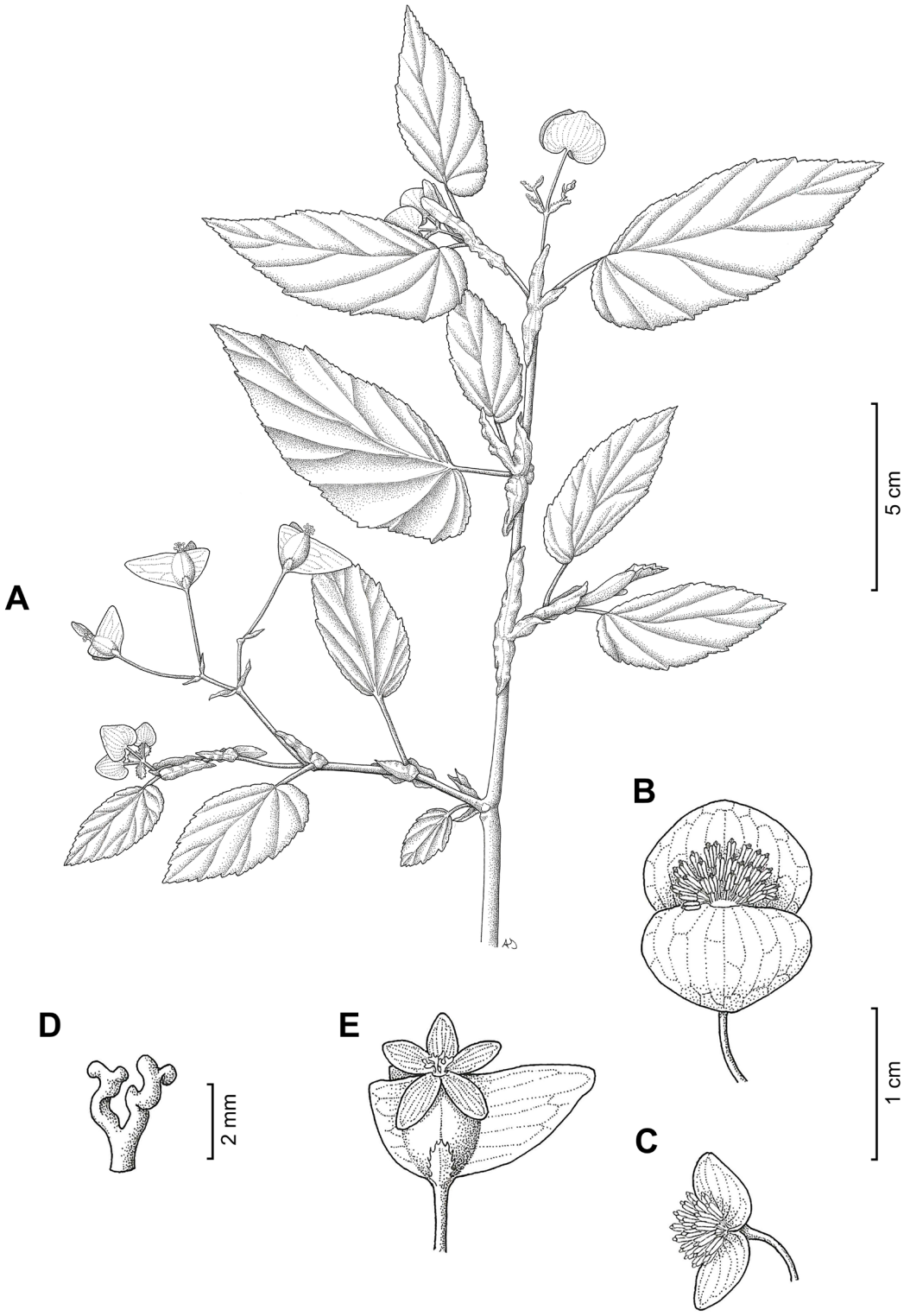


**Fig. 34.** *Begonia vargasii* Moonlight sp. nov. **A**. Habit. **B**. Staminate flower, front view. **C**. Staminate flower, side view. **D**. Close up of stigma and style. **E**. Pistillate flower, side view. Illustration by Anna Dorward from *J.C. Vargas Calderón 15616* (US).

*Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 2 branches, bearing up to 4 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 2.8 cm long, colour unknown, glabrous, bracts persistent, lanceolate, 3–6 × 1–2 mm, translucent, colour unknown, glabrous, apex acuminate, margin entire to serrulate, ciliate to aciliate at the apex. *Staminate flowers*: pedicels to 19 mm long, glabrous; tepals 2, spreading, broadly ovate, 10–12 × 8–13 mm, apex obtuse, colour unknown, glabrous, margin entire, aciliate; stamens ca 40, spreading, yellow, filaments 0.5–2.5 mm long, free, anthers ellipsoid, 1–1.5 × 0.75 mm, dehiscing via lateral slits, connectives extending to 0.5 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 8 mm long; bracteoles 2, lanceolate to ovate, 1.5–2.5 × 0.5–1.5 mm, translucent, colour unknown; tepals 5, subequal, deciduous in fruit, spreading, elliptic to ovate, 2.5–6 × 1.5–3 mm, apex rounded to acute, colour unknown, glabrous, margin entire, aciliate; ovary body ovoid, ca 3 × 1.5 mm, colour unknown, glabrous, unequally 3-winged, wings triangular, largest ca 4 × 2 mm, smallest ca 4 × 1 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 2.5–3 mm long, irregularly 2-3 times-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 23 mm long. *Fruit body* ovoid, to 9 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding 8 × 16 mm, the smallest expanding to 8 × 4 mm.

**Proposed conservation assessment**

Known from a single specimen, which was collected in a relatively undisturbed area. Little is known about the population size of this species, which we assess as Vulnerable (VU D2) due to its small known range.

**Identification notes**

Most similar to *B. oblanceolata* (see Diagnosis) but, within Peru, most similar to *B. obtecticaulis*. It is readily distinguished by its serrulate (vs irregularly double dentate) leaf margins and its asymmetrical stipules, which are auriculate on the broad side and cuneate on the narrow side (vs symmetrical, cuneate on both sides). This character is shared with *B. imbrexiformis* sp. nov., but *B. vargasii* sp. nov. is readily distinguished from this species by its palmate-pinnate (vs pinnate) leaf venation.

**Distribution and ecology**

Endemic to Peru and Cusco Region (Fig. 24C). Found in middle montane forest at an elevation of 2040 m a.s.l. *Begonia vargasii* sp. nov. may be most common on the edge of montane forest patches in common with most of its relatives.

## *The stenotepala group of Begonia sect. Cyathocnemis*

We define herein the stenotepala group of *B.* sect. *Cyathocnemis*, including members of the section with five tepals in the pistillate flower (except some individuals of *B. subspinulosa*) and bifurcating styles but lacking notches in their largest fruit wings. There are seven members of the group and all are found in Peru (*B. alto-peruviana* A.DC., *B. brevicordata*, *B. deltoides* Moonlight sp. nov., *B. longitepala* Moonlight sp. nov., *B. lucifuga* Irmsch., *B. stenotepala* L.B.Sm. & B.G.Schub., *B. subspinulosa*) with the range *B. alto-peruviana* extending into northern Bolivia. The centre of diversity for the group is the Cusco Region of Peru and most species are found at low densities in the understories of dense lower montane forest. Perhaps as a consequence of this, only three species are known from > 5 specimens. Species delimitation within the group is difficult as few specimens have been collected with all three of staminate flowers, pistillate flowers, and fruits.

19. ***Begonia alto-peruviana*** A.DC.
Fig. 35A

*Prodromus Systematis Naturalis Regni Vegetabilis* 11: 123 (de Candolle 1859). – **Type**: BOLIVIA – **Prov. Larecaja** • Vallées entre Tipuani et Apolobamba; May 1847; *M.H. Weddell 4556*; lectotype: P [P05586898, photo K], first stage designated by Smith & Schubert (1941a: 185); second stage designated by Smith & Schubert (1944: 81).
de Candolle (1864: 289); Smith & Schubert (1941a: 185, 1944: 81); Wasshausen *et al.* (2014: 383).

**Etymology**

The type specimen of this species was collected in La Paz Department in modern day Bolivia. Much of Bolivia was previously governed by Spain as Alto Peru and the species epithet is in reference to this, despite the fact Bolivia was declared independent before the type was collected and long before the protologue was published.

**Specimens examined**

PERU – **Cusco Region: Prov. Quispicanchis** • Marcapata-Quincemil road, between Puente Capiri and Mandor; 13°24′ S, 70°33′ W; 1152 m a.s.l.; 8 Jan. 2015; *M.C. Tebbitt & A. Daza 808*; E [E01059294], MOL. – **Puno Region: Prov. Carabaya** • Alrededores de San Gabán; 13°38′32.94″ S, 70°28′12.9″ W; 1610–1700 m a.s.l.; 9 Jan. 2016; *H. Trinidad HT-4101*; USM • Ollachea-San Gabán road, Camatane; [13°38′ S, 70°27′ W]; 25 Aug. 1980; *J.D. Boeke & S. Boeke 3206*; NY • Ollachea abajo; [13°37′ S, 70°27′ W]; 1200–1400 m a.s.l.; Jul. 1966; *J.C. Vargas Calderón 17597*; MO [MO-1835899]. – **Prov. Sandia** • bajando a Valle Grande; [14°18′ S, 69°27′ W]; 2200 m a.s.l.; 7 Aug. 1957; *J.C. Vargas Calderón 11845*; CUZ.

**Description**

Caulescent herb, to 1 m high. *Stem* erect, branching; internodes to 5.5 cm long, to 5 mm thick, succulent, brown, glabrous. *Stipules* deciduous, elliptic, ca 35 × 10 mm, apex obtuse, translucent, pale green, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 2.5–5.5 cm long, green, glabrous to sparsely pilose; blade asymmetric, ovate, to 19 × 10 cm, succulent, apex short-acuminate, base cordate, basal lobes not overlapping, sinus to 25 mm deep, margin serrulate, ciliate, upper surface dark green, glabrous, lower surface pale green to red, glabrous, veins palmate-pinnate, 7–8 veined from the base, with 3–4 secondary veins on the larger side, 1–3 secondary veins on the larger side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with 16 branches, bearing up to 32 staminate flowers and 16 pistillate flowers, protandrous; peduncle to 7.5 cm long, colour unknown, glabrous, bracts deciduous, ovate, ca 1 × 0.5 mm, translucent, colour unknown, glabrous, apex obtuse, margin entire, aciliate. *Male flowers*: pedicels to 8 mm long, glabrous; tepals 2, spreading, broadly ovate, 6–7 × 6–8 mm, apex obtuse, white flushed pink, glabrous, margin entire, aciliate; stamens ca 15, spreading, yellow, filaments ca 2 mm long, free, anthers ellipsoid, ca 1.5 × 0.5 mm long, dehiscing via lateral slits, connectives extended to 0.2 mm, symmetrically basifixed. *Female flowers*: pedicels to 30 mm long; bracteoles 3, positioned directly beneath the ovary, broadly-ovate, 5–6 × 6–7 mm, apex rounded, translucent, pink, glabrous, margin serrate, ciliate; tepals 5, subequal, persistent in fruit, spreading, lanceolate, 12–15 × 4–6 mm, apex obtuse, white, glabrous, margin entire, aciliate; ovary body ovoid, 8–10 × 6–8 mm, white flushed pink on the outside, glabrous, unequally 3-winged, wings triangular, largest 8–11 × 10–13 mm, smallest 10–11 × 4–5 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 4–6 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 35 mm long. *Fruit body* ovoid, to 10 × 8 mm, drying pale brown, wings same shape as in ovary, the largest expanding to 15 × 15 mm, the smallest expanding to 14 × 6 mm.

**Proposed conservation assessment**

Broadly distributed with a range encompassing Cuzco and Puno Regions of Peru and much of northern and central Andean Bolivia. It seems common within its Bolivian range and was extremely common in September 2020 in the valley of the río Sandia, including in disturbed areas, despite being known from only a single collection in this area. We assess *B. alto-peruviana* as Least Concern (LC).

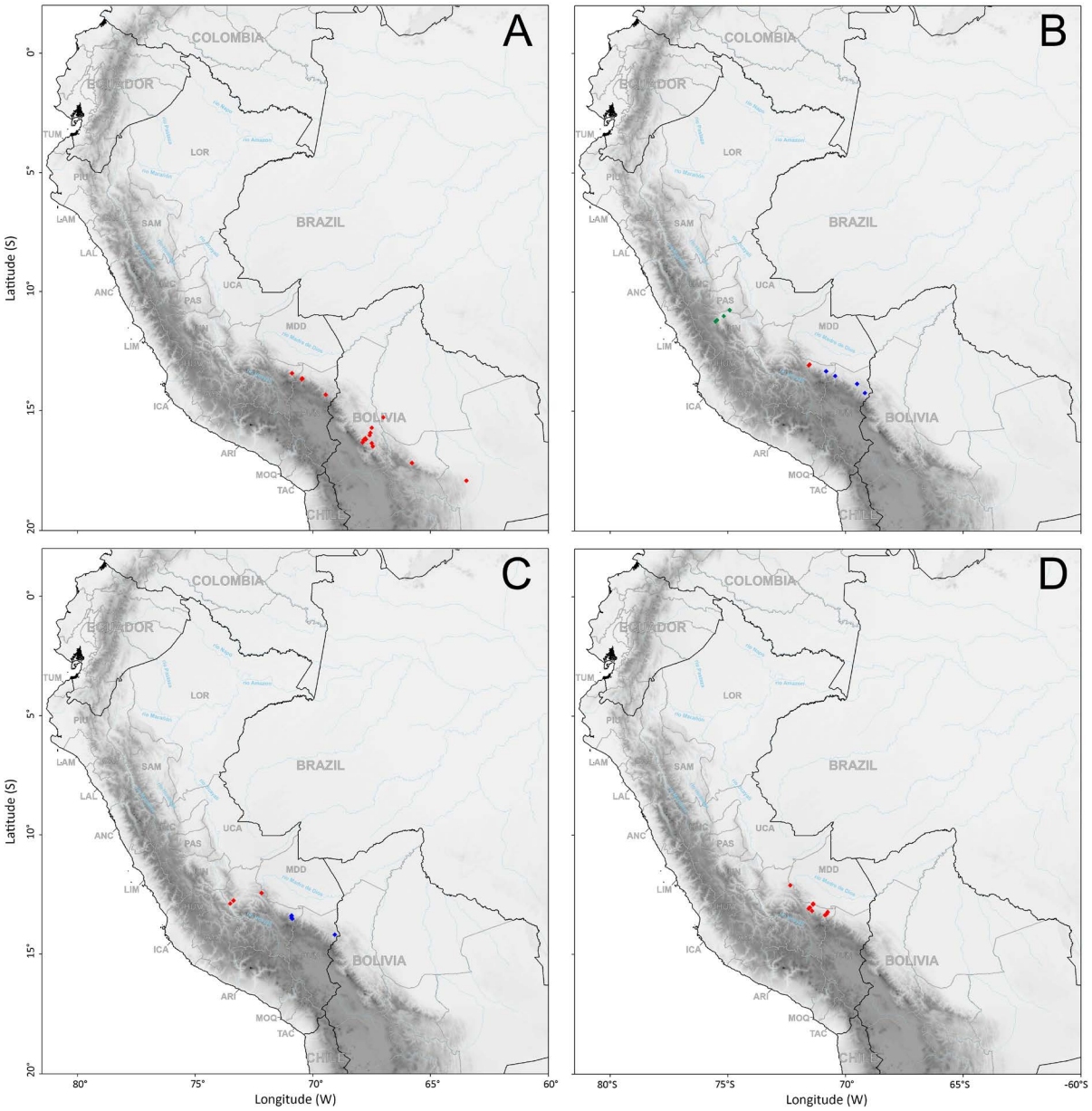


**Fig. 35.** Distribution of the stenotepala group of *Begonia* sect. *Cyathocnemis* (Klotzsch) A.DC. in Peru and surrounding countries. **A**. *B. alto-peruviana* A.DC. (red). **B**. *B. brevicordata* L.B.Sm. & B.G.Schub. (red), *B. deltoides* Moonlight sp. nov. (blue), and *B. lucifuga* Irmsch (green). **C**. *B. longitepala* Moonlight sp. nov. (red) and *B. subspinulosa* Irmsch. (blue). **D**. *B. stenotepala* L.B.Sm. & B.G.Schub. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

**Typification notes**

The protologue of *B. alto-peruviana* cited material collected by Weddell "in Peruvia Alta sive Bolivia" but cited no specific collection (de Candolle 1859: 123). The first stage of lectotypification was carried out by Smith & Schubert (1941a: 185), who cited the collection *M.H. Weddell 4556*. The same authors later cited a duplicate of this collection in Paris herbarium as the type, which constitutes the second stage of lectotypification (Smith & Schubert 1944).

**Notes**

This represents the first confirmed record of *B. alto-peruviana* from Peru. De Candolle (1859) was unsure of whether the type collection was made in Peru or Bolivia, but it was collected in Bolivia. Smith & Schubert (1941a) stated that the species "undoubtedly occurs in Peru" but cited no specimens. *Begonia alto-peruviana* was later included in the checklist of plants of Peru (Brako & Zarucchi 1993) but based only upon Smith & Schubert's flora account (Smith & Schubert 1941a).

**Identification notes**

*Begonia alto-peruviana* is one of three species in the stenotepala group with white to pink tepals with obtuse to rounded apices, sharing these characters with *B. brevicordata* and *B. subspinulosa*. It is best distinguished from these species by vegetative characteristics. *Begonia brevicordata* is a much less robust species and while it does reach 1 m in height it has much more delicate stems (reaching 3 mm wide) compared to *B. alto-peruviana*, whose mature stems are always at least 5 mm wide. The leaves of *B. brevicordata* are much smaller (reaching 6.5 × 4.5 cm) than those of *B. alto-peruviana* (which reach 19 × 10 cm) and are much more rounded in outline (the leaves of *B. alto-peruviana* are around twice as long as wide whereas those of *B. brevicordata* are usually wider than they are long). It differs from *B. subspinulosa* in its early deciduous stipules, which are rarely seen on specimens in contrast to the conspicuous, persistent stipules of *B. subspinulosa*. While both species have serrulate (to serrate) leaf margins, the margins of *B. subspinulosa* have a distinctive, sharp appearance lacking in *B. alto-peruviana*. Finally, *B. subspinulosa* can have three or five tepals while *B. alto-peruviana* always has five.

**Distribution and ecology**

Known from Peru and Bolivia and within Peru collected in Cuzco and Puno Regions (Fig. 35A). Found in lower and middle montane forest at an elevation of 1152–1700 m a.s.l.

20. ***Begonia brevicordata*** L.B.Sm. & B.G.Schub.
Fig. 35B

*Journal of the Washington Academy of Sciences* 45 (4): 113 (Smith & Schubert 1955). – **Type**: PERU – **Cusco Region: [Prov. Paucartambo]** • Dist. Kosñipata, Santa Isabel; [13°02′ S, 71°31′ W]; 1320 m a.s.l.; Dec. 1947; *J.C. Vargas Calderón 6767*; holotype: US [US00115262]; isotypes: CUZ [CUZ13845].

Brako & Zarucchi (1993: 191); León & Monsalve (2006: 165).

**Etymology**

The epithet is derived from the Latin '*brevis*' and '*cordata*', meaning 'shortly cordate', referring to the subcordate leaf bases of the species.

### Specimens examined

PERU – **Cusco Region: Prov. Paucartambo** • Dist. Kosñipata, Santa Isabel; [13°02′ S, 71°31′ W]; 1200 m a.s.l.; 23–31 Jul. 1948; *R. Scolnik 927*; US [US00222036] • Dist. Kosñipata, road from Paucartambo to Manu National Park; 13°04′ S, 71°33′ W; 1846 m a.s.l.; *M.C. Tebbitt & A. Daza 822*; E [E01059293], MOL, USM.

### Description

Caulescent, herb, to 40 cm high. *Stem* erect, rarely branching; internodes to 6 cm long, to 3 mm thick, succulent, green flushed red, glabrous to sparsely villous. *Stipules* deciduous, lanceolate, 8–11 × 1.5–4 mm, apex acute, opaque, green flushed red, glabrous to sparsely villous, margin entire, aciliate. *Leaves* > 5 per stem, alternate, basifixed; petiole 1–4 cm long, green flushed red, glabrous; blade asymmetrical, broadly ovate, to 6.5 × 4.5 cm, succulent, apex short-acuminate, base truncate to short-cordate, margin irregularly serrate, ciliate, upper surface green, glabrous, lower surface green, glabrous, veins palmate but with one primary vein, 5–7 veined from the base, with 1–2 secondary veins on the larger side, 1–2 on the smaller side. *Inflorescences* 1–2 per stem, bisexual, axillary, erect, cymose, with 4 branches, bearing up to 4 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 4 cm long, pale green to pink, glabrous, bracts deciduous, oblanceolate, 2–14 × 0.5–4 mm, translucent, pale green flushed red, glabrous, apex acute to rounded, margin entire, aciliate. *Staminate flowers*: pedicels to 11 mm long, glabrous; tepals 2, spreading, broadly ovate, 6–8 × 5–6 mm, apex acute, white, glabrous, margin entire, aciliate; stamens number unknown, spreading, yellow, filaments 1.5–2 mm long, free, anthers ellipsoid, ca 1 × 0.4 mm long, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 8 mm long; bracteoles 3, positioned directly beneath the ovary, ovate, 1.5–2 × 0.5–1 mm, apex acute to acuminate, translucent, colour unknown, glabrous, margin entire, aciliate; tepals 5, subequal, deciduous in fruit, spreading, obovate to broadly obovate, 5–11 × 1.5–8 mm, apex acute to acuminate, white, glabrous, margin entire, aciliate; ovary body obdeltoid, 1.5–3 × 1–2.5 mm, white flushed pink, glabrous, unequally 3-winged, wings triangular, largest 1.5–3 × 1.5–2 mm, smallest rib-like 0.5–1 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 1.5–2 mm long, once-divided, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 14 mm long. *Fruit body* obdeltoid, to 8 × 5 mm, drying light brown, the largest wing expanding to a contorted, downward pointing band, to 8 × 10 mm, the smallest two rib-like, expanding to 2 mm wide.

### Proposed conservation assessment

Previously assessed as Data Deficient by León & Monsalve (2006). Known from two localities in Cusco Region, with a combined EOO of < 100 km$^2$. Within its range, it has a patchy distribution and is found in small populations in humid microhabitats. We assess *B. brevicordata* as Vulnerable (VU D2) due to its limited distribution.

### Identification notes

*Begonia brevicordata* is the smallest member of the stenotepala group, reaching maturity at around 20–40 cm tall. It is distinct in its small (to 6.5 × 4.5 cm) broadly ovate leaves with a truncate or short-cordate base. It is also unusual within the group in its bracteoles with entire, aciliate margins.

*Begonia brevicordata* may also be confused with *B. lophoptera*, which is a similar sized species which often has broadly ovate leaves and is found in the same habitat. When flowering, it can be distinguished by its pistillate flowers with 5 tepals (vs 2) and its staminate flowers with tepals with an acute to acuminate apex. It can be distinguished when sterile by its glabrous petioles (vs sparsely to densely pilose).

**Distribution and ecology**

Endemic to Peru and Cusco Region (Fig. 35B), where it is found in lower and middle montane Forest at an elevation of 900–1856 m a.s.l. *Begonia brevicordata* is typically collected from small populations in permanently wet and shaded microhabitats within montane forests.

21. ***Begonia deltoides*** Moonlight sp. nov.
urn:lsid:ipni.org:names:77323292-1
Figs 35B, 36

**Diagnosis**

Most similar to *B. stenotepala* but differing in its deltoid leaf laminae (vs transversely ovate) with serrate (vs entire to serrulate) margins; its smaller stipules (8–12 × 2–6 mm vs 12–35 × 5–8 mm); and its staminate flowers staminate flowers with fewer stamens (15–20 vs ca 30) and smaller (ca 7 × 4.5 mm vs 5–18 × 4–8 mm) red brown tepals with an obtuse apex (vs bright red or orange with an acuminate apex).

**Etymology**

From the triangular Greek letter Delta (Δ), referring to the distinctive triangular or deltoid outline of the species' leaves.

**Type**

PERU – **Puno Region: Prov. Carabaya** • Km 11 of road from San Gabán (=Lanlacuni Bajo) to Macusani; [13°31′ S, 70°26′ W]; 1000 m a.s.l.; 19 Oct. 1984; *P.J.M. Maas, H. Maas, C. Roersch, L.Y.T. Westra 6096*; holotype: USM; isotypes: U [U1144397].

**Specimens examined**

PERU – **Cusco Region: Prov. La Convención** • Dist. Camanti, Vitobamba, SE of Quincemil, km 234 on main highway Quincemil-Cusco, Bocatoma' 13.3183°S, 70.8156°W; 800–1000 m a.s.l.; 16 May 2010; *J.L. Clark, L. Clavijo, J. Janovec, M. Overstreet & J. Wells 11468*; US [US01176971], USM. – **Puno Region: Prov. Sandia** • Oroya-Santo Domingo trail; [13°51′ S, 69°30′ W]; 13 May 1943; *W.H. Hodge 6029*; US [US00967198], USM • Near Sagrario; [13°55′ S, 69°41′ W]; 1000–1300 m a.s.l.; 26 May 1942; *R.D. Metcalf 30630*; MO [MO-2264411], US [US00222355] • San Juan de Oro, atque per viam usque ad Seito-Cocha cerca pagum; [14°14′ S, 69°10′ W]; 1400–4350 m a.s.l.; 23–25 Oct. 1976; *L. Bernardi, A. Charpin & F. Jacquemoud 16803*; G.

**Description**

Caulescent herb, to 40 cm high. *Stem* erect, occasionally branching; internodes to 9 cm long, to 5 mm thick, succulent, maroon, glabrous. *Stipules* persistent, ovate, 8–20 × 2–11 mm, apex obtuse, mucronate, opaque, brown, glabrous, margin entire, aciliate. *Leaves* 2–5 per stem, alternate, basifixed; petiole 1–4.5 cm long, maroon, sparsely pilose; blade asymmetric, deltoid, to 14 × 7 cm, membranaceous, apex acuminate, base truncate, basal lobes angular on the wider side, cuneate on the narrow side, sinus to 2.5 mm deep, margin irregularly dentate, ciliate, upper surface green, glabrous, lower surface maroon, glabrous, veins palmate-pinnate, 4–6 veined from the base, with 4–6 secondary veins on the larger side, 2–4 secondary veins on the smaller side. *Inflorescences* 2–4 per stem, bisexual, axillary, erect, cymose, with 4 branches, bearing up to 8 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 14 cm long, light brown, glabrous, bracts deciduous, broadly ovate, 3–4 × 1.5–4 mm, translucent, light brown, glabrous, apex rounded, margin serrulate, ciliate. *Staminate flowers*: pedicels to 4 mm long, glabrous; tepals 2, spreading, ovate, 5–9 × 4.5–6 mm, apex obtuse, red-brown, glabrous, margin entire, aciliate; stamens 15–20, projecting, yellow, filaments 1–1.5 mm long, free, anthers ellipsoid, ca 1.5 ×

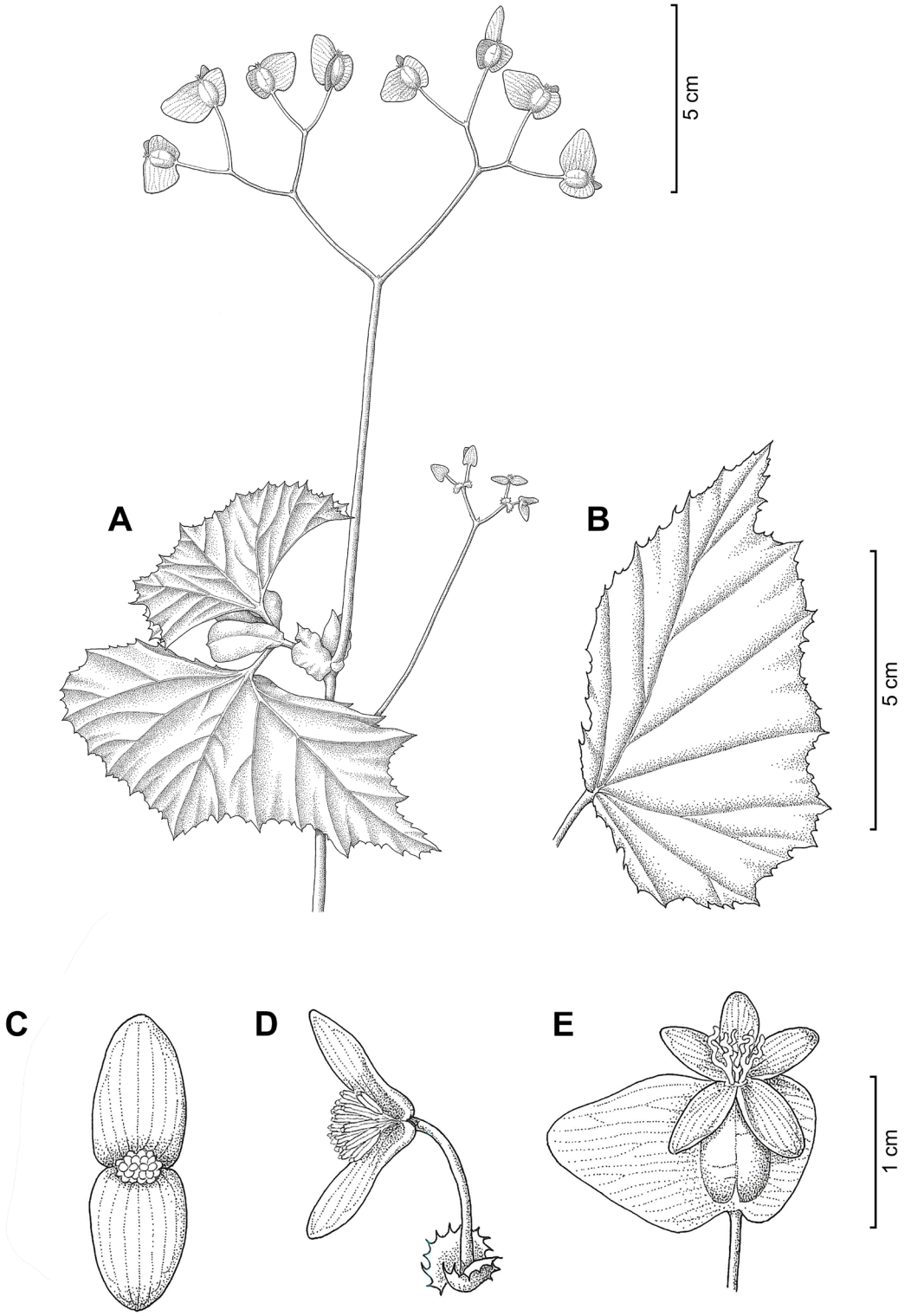


**Fig. 36.** *Begonia deltoides* Moonlight sp. nov. **A**. habit. **B**. leaf, adaxial surface. **C**. staminate flower, front view. **D**. staminate flower, side view. **E**. pistillate flower, side view. Illustration by Anna Dorward from *W.H. Hodge 6029* (US).

0.5 mm, dehiscing via lateral slits, connectives extended to ca 0.5 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles 3, positioned directly beneath the ovary, ovate, ca 5 × 3 mm, apex rounded, translucent, colour unknown, glabrous, margin lacerate, ciliate; tepals 5, subequal, deciduous in fruit, spreading, elliptic, 4–7 × 2.5–4 mm, apex acuminate, red brown, glabrous, margin entire, aciliate; ovary body ovoid, ca 5 × 2.5 mm, colour unknown, glabrous, unequally 3-winged, largest wing rectangular, ca 7 × 2.5 mm, smallest two marginal ca 2 mm wide; 3-locular, placentae unknown; styles 3, colour unknown, free, 3 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 17 mm long. *Fruit body* ovoid, to 8 × 5 mm, drying brown, unequally 3-winged, the largest triangular, expanding to 12 × 15 mm, the smallest triangular, expanding to 8 × 4 mm.

**Proposed conservation assessment**

Known with certainty from three populations with a combined EOO of ca 1000 km$^2$. We have not observed this species in the field and its sparse collection record suggests it is found either at low densities or in localised populations. We assess *B. deltoides* sp. nov. as Vulnerable (VU D2) due to its small number of known populations.

**Notes**

The sectional placement of *B. deltoides* sp. nov .is unclear, primarily because we know of no collections with pistillate flowers. Its erect habit and palmately nerved leaves strongly suggest the species is either a member of *B.* sect. *Cyathocnemis* or *B.* sect. *Hydristyles*, which are distinguished by whether their styles are bifid or multifid, respectively. The styles of this species are persistent and remain on the fruits at maturity but are generally desiccated and reduced in size. Irrespective, the persistent styles are bifid, so we place *B. deltoides* sp. nov. in *B.* sect. *Cyathocnemis*. Within this section, the persistent stipules and staminate flowers with relatively long and thin, coloured tepals are reminiscent of the stenotepala group so we tentatively place the species here.

**Identification notes**

*Begonia deltoides* sp. nov. is superficially similar to *B. unduavensis* Rusby, which is endemic to Bolivia. Both species have deltoid leaves, but *B. deltoides* sp. nov. is glabrous throughout while both surfaces of the leaves of *B. unduavensis* are sparsely pilose. The two species differ in their flowers as *B. deltoides* sp. nov. has staminate flowers with 15–20 stamens (vs ca 75 stamens) and pistillate flowers with bifid styles (vs multifid styles).

Within Peru, *B. deltoides* sp. nov. is most similar to *B. stenotepala* (see Diagnosis) but these species are unlikely to be confused on account of their very different leaf shapes and flower colours. *Begonia deltoides* sp. nov. is more likely to be confused with *B. fischeri*, which is a similar sized species with deltoid leaves. *Begonia fischeri* is a more delicate, succulent annual or perennial whereas *B. deltoides* sp. nov. is a more robust perennial. In flower, they are easy to distinguish as the tepals of *B. fischeri* are white, while those of *B. deltoides* sp. nov. are red brown.

**Distribution and ecology**

Known with certainty only from Peru and Puno Region (Fig. 34B). Found within lower montane forest at an elevation of 1000–1400 m a.s.l. and possibly higher (see *L. Bernardi, A. Charpin & F. Jacquemoud 16803*).

22. ***Begonia longitepala*** Moonlight sp. nov.
urn:lsid:ipni.org:names:77323294-1
Figs 35C, 37

**Diagnosis**

Most similar to *B. lucifuga* but differing in the long-acuminate apices to both its staminate and pistillate flowers (vs rounded apices); its smaller stipules (8–12.5 × 1.5–3 mm vs 15–25 × 5–10 mm) with an acute (vs obtuse) apex; its fewer stamens (10–18 vs 25–30).

**Etymology**

Named for the elongate, acuminate apices of the tepals on the staminate flowers.

**Type**

PERU – **Cusco Region: Prov. La Convención** • Dist. Echarate, Kepashiato; 12°44′02″ S, 73°22′03″ W; 1167 m a.s.l.; 19 Aug. 2006; *L. Valenzuela, E. Suclli, G. Calatayud & A. Carazas 7505*; holotype: MO [MO-2038338].

**Specimens examined**

PERU – **Cusco Region: Prov. La Convención** • Localidad San Antonio; 12°25′ S, 72°11′ W; 1464 m a.s.l.; 20 Aug. 2005; *G. Calatayud et al. 3295*; MO [MO-2153571], US [US00932198] • Dist. Echarate, Santa Ana, Kepashiato, 12°44′27″ S, 73°22′14″ W; 1280 m a.s.l.; 20 Aug. 2006; *L. Valenzuela, E. Suclli, G. Calatayud & A. Carazas 7523*; MO [MO-2183897], US [US00951224], USM • Dist. Echarate, LlactaHuamán, N del río Apurimac, NE de Pueblo Libre, S de la Cordillera de Vilcabamba; 12°51′55.5″ S, 73°30′40″ W; 1650 m a.s.l.; 15 Jul. 1998; *S. Baldeón M., N. Nauray, R. de la Colina & S. Udvardy 3060*; US [US00625239], USM.

**Description**

Caulescent, herb, to 60 cm high. *Stem* erect, rarely branching; internodes to 7.3 cm long, to 3 mm thick, succulent, colour unknown, glabrous. *Stipules* deciduous, lanceolate, 8–27 × 1.5–5 mm, apex acuminate, translucent, colour unknown, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 0.5–4.5 cm long, colour unknown, glabrous; blade asymmetric, transversely elliptic to oblanceolate, to 13 × 5.8 cm, membranaceous, apex short-acuminate to acuminate, base rounded on the widest side, cuneate on the narrow side, margin serrulate, ciliate, upper surface colour unknown, glabrous, lower surface colour unknown, glabrous, veins palmate-pinnate, 3–5 veined from the base, with 4–5 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with 4 branches, bearing up to 4 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 9 cm long, colour unknown, glabrous, bracts late deciduous, lanceolate to oblanceolate, 2.5–14 × 1.5–4 mm, translucent, colour unknown, glabrous, apex acute, margin lacerate, ciliate. *Staminate flowers*: pedicels to 9 mm long, glabrous; tepals 2, spreading, lanceolate, 5–16 × 3–8 mm, apex long-acuminate, white, pink, or orange, glabrous, margin entire, aciliate; stamens 10–18, spreading, yellow, filaments 0.5–1 mm long, free, anthers ellipsoid, 1.5–2 × 0.5 mm long, dehiscing via lateral slits, connectives extended to 0.5 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 8.5 mm long; bracteoles 3, positioned directly beneath the ovary, broadly ovate, 3.5–4.5 × 3–3.5 mm, apex rounded, translucent, colour unknown, glabrous, margin lacerate, ciliate; tepals 5, subequal, deciduous in fruit, spreading, lanceolate, 5–8.5 × 1.5–4 mm, apex acuminate, white, pink or orange, glabrous, margin entire, aciliate; ovary body ovoid, ca 3.5 × 2 mm, colour unknown, glabrous, unequally 3-winged, largest wing rectangular, ca 4 × 5.5 mm, smallest two triangular ca 3.5 × 2.5 mm; 3-locular, placentae unknown; styles 3, yellow, free, ca 3 mm long, once-divided, stigmatic papillae in a spirally twisted

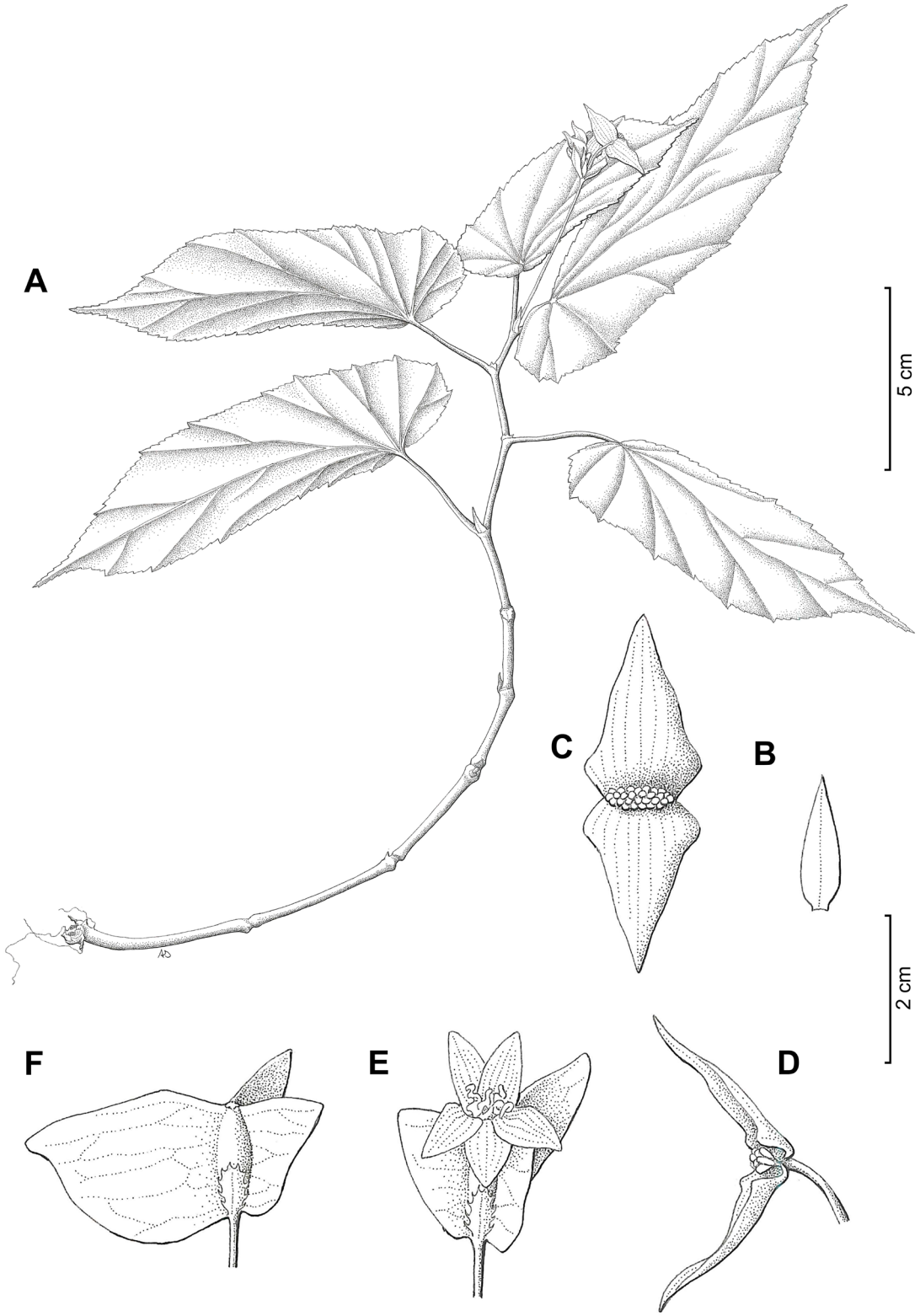


**Fig. 37.** *Begonia longitepala* Moonlight sp. nov. **A**. Habit. **B**. Stipule. **C**. Staminate flower, front view. **D**. Staminate flower, side view. **E**. Pistillate flower, side view. **F**. Fruit, side view. Illustration by Anna Dorward from *L. Valenzuela, E. Suclli, G. Calatayud & A. Carazas 7523* (US).

band. *Fruiting pedicel* to 9 mm long. *Fruit body* ovoid, to 7 × 3.5 mm, drying brown, wings same shape as in ovary, the largest expanding to 12 × 15 mm, the smallest to 9 × 8 mm.

**Proposed conservation assessment**

Known from two populations at the south of the Cordillera Vilcabamba and a third close to the border of the Santurio Nacional Megatoni. None of the known collections are in protected areas and one is immediately adjacent to a road. Satellite images taken in 2020 show extensive forest and little deforestation close to all three populations. Irrespective, we assess *B. longitepala* sp. nov. as Endangered (EN B1ab(iii)) on account of its low EOO (ca 660 km$^2$), its few populations, and the proximity of one of those collections to a road.

**Notes**

No specimens of *B. longitepala* sp. nov. are known with staminate flowers, and mature pistillate flowers, as well as fruits. We designate the sheet *L. Valenzuela, E. Suclli, G. Calatayud & A. Carazas 7505* (MO [MO-2038338]) as the holotype as it is the only specimen with staminate and mature pistillate flowers.

**Identification notes**

*Begonia longitepala* sp. nov. is a rare species and difficult to identify with confidence. While it is a member of *B.* sect. *Cyathocnemis*, its slender stems, early deciduous stipules, and long-narrow leaves are not typical of the section but reminiscent of *B. rossmanniae* or members of *B.* sect. *Ruizopavonia*. It can be distinguished from members of both sections by its palmate-pinnate venation, which contrasts with the pinnate venation of *B.* sect. *Ruizopavonia* and pinnate venation with 3-veins from the base of *B. rossmanniae*.

Within *B.* sect. *Cyathocnemis*, *B. longitepala* sp. nov. is most similar to *B. lucifuga*, with which it shares its deciduous stipules and its relatively long and thin leaves. It differs in its elliptic to oblanceolate leaves (vs lanceolate); its tepals, which have a long-acuminate apex on both the staminate and pistillate flowers (vs a rounded apex in *B. lucifuga*) and its stamens which do not have an extended connective. Its acuminate tepals may lead to confusion with *B. stenotepala*, but this species can be easily distinguished by its large (1.2–3.5 cm long), persistent stipules, which contrast with the much smaller (< 1.25 cm long), deciduous stipules of *B. longitepala* sp. nov.

**Distribution and ecology**

Endemic to Peru and Cusco Region (Fig. 35C). Known from lower montane forest at an elevation of 1167–1650 m a.s.l.

### 23. ***Begonia lucifuga*** Irmsch.
Fig. 35B

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 608 (Irmscher 1949). – **Type**: PERU – **Junín Region** • Huacapistana; [11°14′ S, 75°31′ W]; 1800 m a.s.l.; 6 Jun. 1929; *E.P. Killip & A.C. Smith 27300*; holotype: US [US00955825]; isotype: NY [NY01085496].
Brako & Zarucchi (1993: 193); Vásquez *et al.* (2005: 112–125); León & Monsalve (2006: 167).

**Etymology**

The epithet derives from the Latin '*lux*' and '*fugure*' meaning 'light' and 'to escape'. This refers to the species' preferred habit, which is deep shade.

**Specimens examined**

PERU – **Pasco Region: Prov. Oxapampa** • Dist. Palcazú, Bosque de protección San Matias-San Carlos. Bosque Secundario Sector Unión-Shimakii; 10°45′04″ S, 74°55′47″ W; 1350–1420 m a.s.l.; 3 Jun. 2003; *A. Monteagudo & G. Ortiz 5685*; HOXA, MO [MO-842669]. – **Junín Region: Prov. Chanchamayo** • Santa Ana, fondo Romero, Pampatigre, above Santa Ana (SE of La Merced); 11°S, 75°10′ W; 1500–1700 m a.s.l.; 7 Mar. 1985; *B.A. Stein & C. Todzia 2338*; MO [MO-1835893] • 1 km along path N along tributary of río Tarma from E side of Puente de Azúcar; 11°10′21″ S, 75°27′13″ W; 1523 m a.s.l.; 23 Jun. 2014; *P.W. Moonlight & A. Daza 46*; MOL.

**Description**

Caulescent herb, to 40 cm high. *Stem* erect, rarely branching; internodes to 2.5 cm long, to 6 mm thick, succulent, red, glabrous. *Stipules* deciduous, ovate, 15–25 × 5–10 mm, apex obtuse, translucent, red, glabrous, margin entire, aciliate. *Leaves* > 3, alternate, basifixed; petiole 15–30 cm long, red, glabrous; blade asymmetric, lanceolate, to 12 × 5 cm, succulent, apex acuminate, base obliquely truncate to obliquely cordate, basal lobes overlapping on the young leaves, sinus to 5 mm deep, margin serrulate to serrate, ciliate, upper surface dark green, glabrous, lower surface red, glabrous, veins palmate-pinnate, 6–8 veined from the base, with 5–7 secondary veins on the larger side, 2–5 secondary veins on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with 3–4 branches, bearing up to 8 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 7 cm long, colour unknown, glabrous, bracts deciduous, obovate, ca 2–3 × 1 mm, translucent, colour unknown, glabrous, apex truncate, margin entire, sparsely ciliate. *Staminate flowers*: pedicels to 24 mm long, glabrous; tepals 2, spreading, broadly ovate, 9–15 × 8–13 mm, apex rounded, pale pink, glabrous, margin entire, aciliate; stamens 25–30, spreading, presumed yellow, filaments 1–2 mm long, free, anthers ellipsoid, 1–2 × 0.5 mm long, dehiscing via lateral slits, connectives extended to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles present, number unknown, positioned directly beneath the ovary, elliptic, ca 1.5 × 1 mm, apex obtuse, translucent, colour unknown, glabrous, margin serrulate, ciliate; tepals 5, subequal, persistence in fruit unknown, projecting, ovate, 3–5 × 2–3 mm, apex obtuse to rounded, pink, glabrous, margin entire, aciliate; ovary body ovoid, ca 2.5–4 × 1–2 mm, colour unknown, glabrous, unequally 3-winged, wings triangular, largest 3–5 × 2–3 mm, smallest 3–4 × 1–1.5 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, colour unknown, free, ca 1.5 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* unknown. *Fruit* unknown.

**Proposed conservation assessment**

Previously assessed as Data Deficient (DD) by León & Monsalve (2006). Known from four collections across four populations with a combined EOO of 214 km$^2$. Despite extensive fieldwork in the species' range, we have only been able to locate a single individual (*P.W. Moonlight & A. Daza 36*), likely because the range of *B. lucifuga* is centred on the valley of the río Chanchamayo. The Peruvian "Carretera Central" (National Route 22) descends from the Andes to the Amazon along this valley and is the only major road across the Andes for ca 200 km in either direction. The Carretera Central has been a major route for more than 150 years and most of the Lower Montane Forest within the valley has been cleared for agriculture. We are also confident that *B. lucifuga* does not grow in large numbers north of its known range in Pasco Region because this part of Peru has for the past 20 years been one of the most intensively collected areas of tropical forest in the world. Considering its rarity, small range, and the habitat destruction across that range, we assess *B. lucifuga* as Endangered (EN B1ab(iii)+B2ab(iii)).

**Identification notes**

Within the stenotepala group, *B. lucifuga* is most similar to *B. brevicordata* and *B. subspinulosa*. These three species have white or pink tepals and the tepals on their staminate flowers have a rounded apex

while the other species in the complex have bright red or orange tepals with an acute to narrowly acute apex. *Begonia lucifuga* differs from these two species in its leaf margins, which are serrulate as opposed to serrate or dentate. Its leaves are also lanceolate in outline and have an acuminate apex, whereas those *of B. subspinulosa* are ovate and those of *B. brevicordata* are broadly ovate in outline and both species have short acuminate leaf apexes.

When sterile, *B. lucifuga* is most likely to be confused with *B. stenotepala* or *B. lucifuga*. It can be distinguished from *B. stenotepala* by its stipules, which are deciduous whereas those of *B. stenotepala* are persistent. *Begonia longitepala* sp. nov. also has deciduous stipules but differs in its elliptic to oblanceolate leaf laminae.

**Distribution and ecology**

Endemic to Peru and known from Pasco and Junín Regions (Fig. 35B). Found in lower montane forest at an elevation of 1350–1800 m a.s.l. *Begonia lucifuga* is found in deep shade and humid areas, including in the shade of forests within gorges.

24. ***Begonia stenotepala*** L.B.Sm. & B.G.Schub.
Figs 1A, 2D, 5C, 35D, 38

*Publications of the Field Museum of Natural History, Botanical Series* 13 (4/1): 200 (Smith & Schubert 1941a). – **Type**: PERU – **Cusco Region** • along río Tambomayo, between Tambomayo and Asunción; [13°03′ S, 71°32′ W]; 900–1400 m a.s.l.; 24 Jul. 1936; *J. West 7114*; holotype: UC [UC578669].
Brako & Zarucchi (1993: 195); León & Monsalve (2006: 169).

**Etymology**

The name derives from the Greek words, '*stenos*' and '*tepalus*', meaning 'narrow' and 'tepal' respectively. This refers to the relatively narrow, triangular tepals of both the staminate and pistillate flowers.

**Selected specimens examined**

PERU – **Cusco Region: Prov. La Convención** • Dist. Echarate, Kapiromashi, 12°09′48″ S, 72°34′31″ W; 750 m a.s.l.; 25–30 Apr. 2004; *N. Salinas, H. Beltrán, R.B. Foster & C. Vriesendorp 6691*; US [US002222332], USM. – **Prov. Paucartambo** • Dist. Kosñipata, pongo de Koñec; 12°53′53″ S, 72°22′25″ W; 700 m a.s.l.; 5 Aug. 2007; *I. Huamantupa 10294*; MO [MO-2132027] • km 67 of road from Paucautambo to Pilcopata; 13°04′24″ S, 71°33′21′ W; 1784 m a.s.l.; 4 Aug. 2014; *P.W. Moonlight & A. Daza 83*; E [E00724451], MOL, USM • Valle del Pilcopata, road from Patria to Pillahuata; 13°10′ S, 71°25′ W; 1000–1500 m a.s.l.; 13 Dec. 1983; *R.B. Foster & T. Wachter 7465*; USM. – **Prov. Quispicanchis** • hills around río Araza between Pan de Azúcar and Quincemil airport; 13°13′ S, 70°45′ W; 643 m a.s.l.; 10 Aug. 1991; *P. Núñez* 14129 (MO [MO-2228053], USM • Mandor, Marcapata; [13°21′ S, 70°52′ W]; 1100 m a.s.l.; 15 Jul. 1945; *J.C. Vargas Calderón 5242*; CUZ • Dist. Marcapata, Quincemil, 13°42′46″ S, 70°59′40″ W; 430–800 m a.s.l.; 23 Oct. 2004; *L. Valenzuela, E. Suclli,. V. Chama, J. La Torre 4267*; MO [MO-1664172], US [US00900536]. – **Madre de Dios Region: Prov. Manu** • izquierda Madre de Dios, cerca pongo; [12°62′ S, 71°22′ W]; 670 m a.s.l.; Jun. 1964; *J.C. Vargas Calderón 15526*; MO [MO-1835898].

**Description**

Caulescent herb, to 1 m high. *Stem* erect, rarely branching; internodes to 7 cm long, to 6 mm thick, succulent, pale green to pink, glabrous. *Stipules* late deciduous to persistent, lanceolate, 12–35 × 5–8 mm, apex acute, translucent, pale green, glabrous, margin entire, aciliate. *Leaves* 4–8, alternate, basifixed; petiole 2–9 cm long, pale red, glabrous; blade strongly asymmetric, lanceolate to ovate, to 18 × 9 cm,

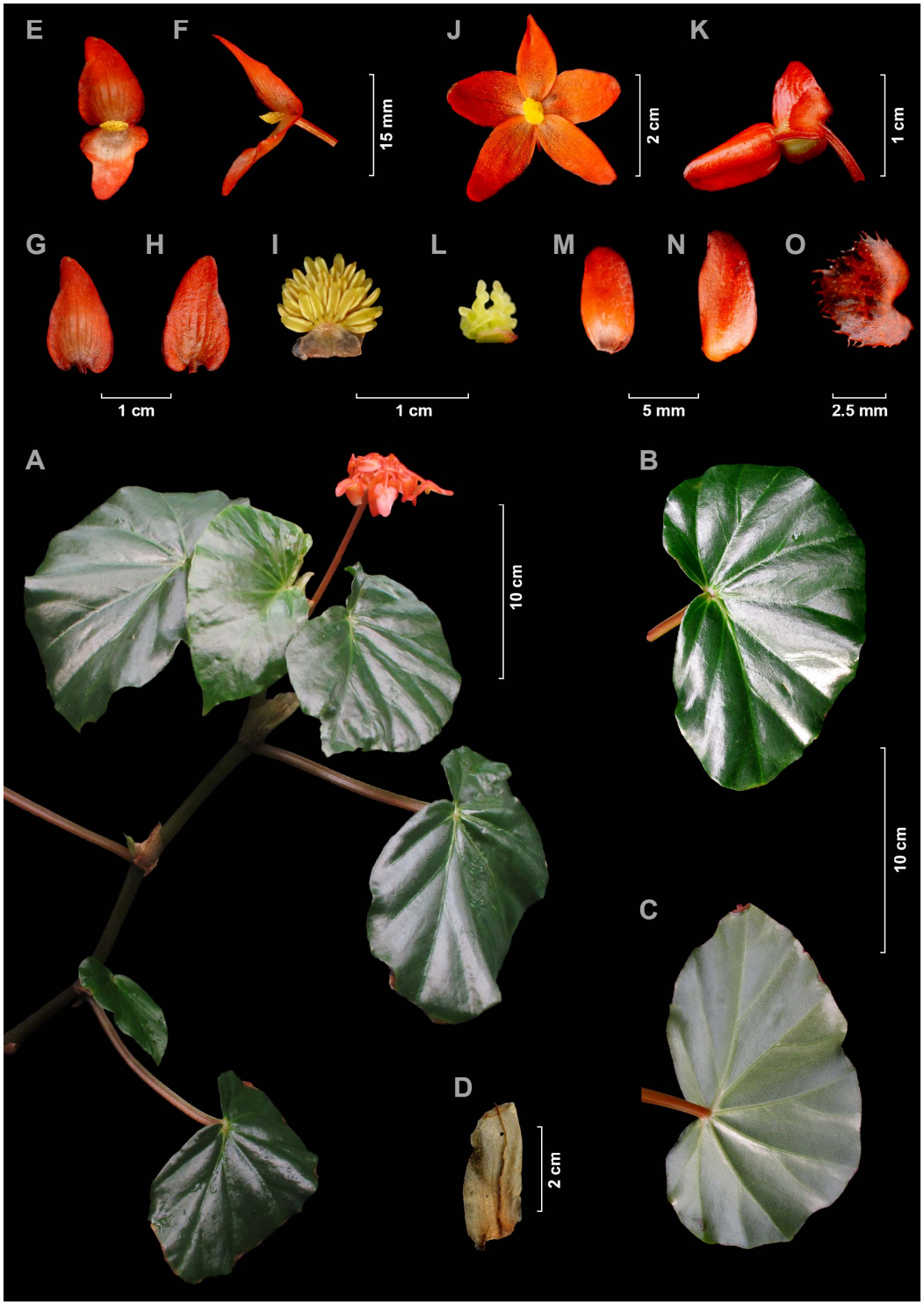


**Fig. 38.** *Begonia stenotepala* L.B.Sm. & B.G.Schub. **A**. Habit. **B**. Leaf, adaxial surface. **C**. Leaf, abaxial surface. **D**. Stipule. **E**. Staminate flower, front view. **F**. Staminate flower, side view. **G**. Top tepal of the staminate flower. **H**. Bottom tepal of the staminate flower. **I**. Androecium, side view. **J**. Pistillate flower, front view. **K**. Pistillate flower, side view. **L**. Pistils, side view. **M**. Smallest tepal of the pistillate flower. **N**. Largest tepal of the pistillate flower. **O**. Bracteole. All photographs taken by D.A. Purvis & P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh (Accession 20141048, grown from seeds collected as part of *P.W. Moonlight & A. Daza 83*).

succulent, apex acuminate, base rounded, margin entire to serrulate, aciliate to ciliate, upper surface dark, glossy green, glabrous, lower surface green to deep red, glabrous, veins palmate but with one primary vein, 5–7 veined from the base, with 1–3 secondary veins on the larger side, 1–3 on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, branching up to 5 times, bearing up to 64 staminate flowers and 16 pistillate flowers, protandrous; peduncle to 12 cm long, red, glabrous, bracts deciduous, ovate, 4–15 × 3–10 mm, opaque, brown, glabrous, apex rounded to acute, margin entire to serrulate, aciliate to ciliate. *Staminate flowers*: pedicels to 5 mm long, glabrous; tepals 2, projecting, lanceolate, 5–18 × 4–8 mm, apex acuminate, bright red or orange, glabrous, margin entire, aciliate; stamens ca 30, projecting, yellow, filaments ca 0.3 mm long, free, anthers linear, 1.5–2 × 0.5 mm, dehiscing through lateral slits, connectives extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles 3, positioned directly beneath the ovary, ovate, 5–5.5 × 4.5–5.5 mm, apex rounded, opaque, bright red or orange, glabrous, margin lacerate, ciliate; tepals 5, subequal, persistent in fruit, projecting, lanceolate, 5–18 × 2–9 mm, apex acute, bright red or orange, glabrous, margin entire, aciliate; ovary body obovoid, 4–7 × 2–4 mm, bright red or orange, glabrous, unequally 3-winged, wings triangular, largest 5–15 × 4–11 mm, smallest two wings 3–8 × 1–3 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 3–4 mm long, once-divided, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 25 mm long. *Fruit body* ovoid, to 12 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding to 18 × 30 mm, the smallest expanding to 12 × 5 mm.

**Proposed conservation assessment**

Previously assessed as Data Deficient (DD) by León & Monsalve (2006). The EOO of the species is < 5000 km$^2$, which is sufficiently small for the species to qualify as endangered. Within its range, however, *B. stenotepala* is common and conspicuous, this species and frequently collected, especially on the borders of the road from Challabamba to Pilcopata, which forms one of the borders of Manu National Park. We estimate from fieldwork in 2014 that the population of *B. stenotepala* here exceeds > 50 k individuals and suspect similar populations are found within the species' range, including within Manu National Park, and surrounding, intact forests. We assess *B. stenotepala* as Least Concern (LC).

**Identification notes**

*Begonia stenotepala* is trivial to identify when in flower on account of its staminate and pistillate flowers with vivid red tepals with acute apices. Similar coloured and shaped tepals are found only in distantly related species with completely different habits (e.g., *B. polypetala*, *B. rossmanniae*, *B. monadelpha*). When sterile, *B. stenotepala* is recognised as an erect herb with transversely ovate leaves and large, persistent stipules. In this respect, it is very similar to *B. subspinulosa*, but the two species can be distinguished by their leaf margins. *Begonia stenotepala* has entire to serrulate margins, which are often aciliate and do not look spinescent. In contrast, the leaf margins of *B. subspinulosa* are serrulate to serrate, always ciliate, with the serrations and ciliate margins appearing superficially sharp.

**Distribution and ecology**

Endemic to Peru and known from Cuzco and Madre de Dios Regions (Fig. 35D). Found in lower and rarely middle montane Forest at an elevation of 670–1880 m a.s.l. The vivid red flowers of the species and its projecting tepals suggest it may be hummingbird pollinated, but no pollinator records are known. *Begonia stenotepala* has been collected in flower from April to December with a peak in July and August, which is the dry season.

25. ***Begonia subspinulosa*** Irmsch.
Figs 35C, 39

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 592 (Irmscher 1949). – **Type**: PERU – **Cusco Region: Prov. Quispicanchis** • Marcapata Valley, between Chaupichaca and Tio; [13°28′ S, 70°54′ W]; 1800–1900 m a.s.l.; 20 Feb. 1929; *A. Weberbauer* 7836[a]; lectotype: B [B100365202], **designated here**; isolectotypes: F [V0042328F], US [US00955813; US00955815] • ibid.; *A. Weberbauer 7836*; syntypes: B [B100365203], F [V0042329F]. – **Cusco Region: Prov. Quispicanchis** • Marcapata Valley, Ochanccaray; [13°23′ S, 70°54′ W]; 1150 m a.s.l.; Aug. 1826; *F.L. Herrera 1171*; syntypes: B [B100365201], US [US00222323; US00967176].

Brako & Zarucchi (1993: 195); León & Monsalve (2006: 169).

*Begonia juntasensis* auct. non Kuntze: Brako & Zarucchi, *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: 193 (Brako & Zarucchi 1993).

*Begonia alto-peruviana* A.DC. pro parte in Brako & Zarucchi, *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: 191 (Brako & Zarucchi 1993).

### Etymology

Named for the species' leaf margins, which are sometimes finely serrate and appear sharp.

### Specimens examined

PERU – **Cusco Region: Prov. Quispicanchis** • río Arazá (NE of Cuzco); [13°22′ S, 70°54′ W]; 1065 m a.s.l., Jan. 1943; *C. Sandeman 3723*; K [K000374268] • Marcapata Valley, Ochanccaray; [13°23′ S, 70°54′ W]; 1150 m a.s.l.; Aug. 1926; *F.L. Herrera 1151*; US [US00222323] • Mandor, Marcapata; [13°23′ S, 70°54′ W]; 1200–1300 m a.s.l.; 15 Dec. 1943; *J.C. Vargas Calderón 3763*; CUZ • On rocks at base of cliffs above río Arazá, about 42 kms from Quincemil on road to Urcos; [13°28′ S, 70°54′ W]; ca 1360 m a.s.l.; 12 Jun. 1960; *H.E. Moore, A. Salazar C., E.E. Smith 8601*; US [US00222171] • Marcapata Valley, Community of Unión Arasa, Cullebrayoc trail; 13.4947°S, 70.8731°W; 2150 m a.s.l.; 26 Apr. 2011; *J.D. Wells & P. Centeno 997*; CUZ. – **Puno Region: Prov. Sandia** • Between San Juan del Oro and San Ignacio; [14°10′ S, 69°04′ W]; 1200 m a.s.l.; 7 Jun. 1982; *D.C. Wasshausen & A. Salas 1208*[a]; US [US00222019]. – **Cultivated** • Grown in Cornel University from *H.E. Moore, A. Salazar C., E.E. Smith 8601*[bis]; 1961; *H.E. Moore, A. Salazar C., E.E. Smith 8601*[bis]; US [US00222022].

### Description

Caulescent, herb, to at least 60 cm high. *Stem* erect, rarely branching; internodes to 6.5 cm long, to 6 mm thick, succulent, colour unknown, glabrous. *Stipules* persistent, ovate, 16–28 × 7–12 mm, apex acute, mucronate, opaque, colour unknown, glabrous, margin entire, aciliate. *Leaves* > 5 per stem, alternate, basifixed; petiole 1–9 cm long, colour unknown, glabrous; blade asymmetric, narrowly ovate to obovate, to 14.5 × 8.5 cm, succulent, apex short-acuminate, base transversely cordate, basal lobes not overlapping, sinus to 35 mm deep, margin serrulate to serrate, ciliate, upper surface colour unknown, glabrous, lower surface colour unknown, glabrous, veins palmate but with one primary vein, 7–9 veined from the base, with 2–3 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 5–7 branches, bearing up to 32 staminate flowers and 32 pistillate flowers, protandrous; peduncle to 12.5 cm long, colour unknown, glabrous, bracts deciduous, ovate to broadly ovate, 1.8–6 × 0.8–8 mm, translucent, colour unknown, glabrous, apex rounded, margin entire to lacerate, ciliate. *Staminate flowers*: pedicels to 11 mm long, glabrous; tepals 2, spreading, broadly ovate, 5–14 × 4.5–10 mm, apex obtuse to rounded, pink, glabrous, margin entire, aciliate; stamens 20–35, spreading, yellow, filaments 0.5–1 mm long, free, anthers cuboid, ca 0.75 × 0.5 mm, dehiscing via lateral slits, connectives extended ca 0.1 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles 3, positioned directly

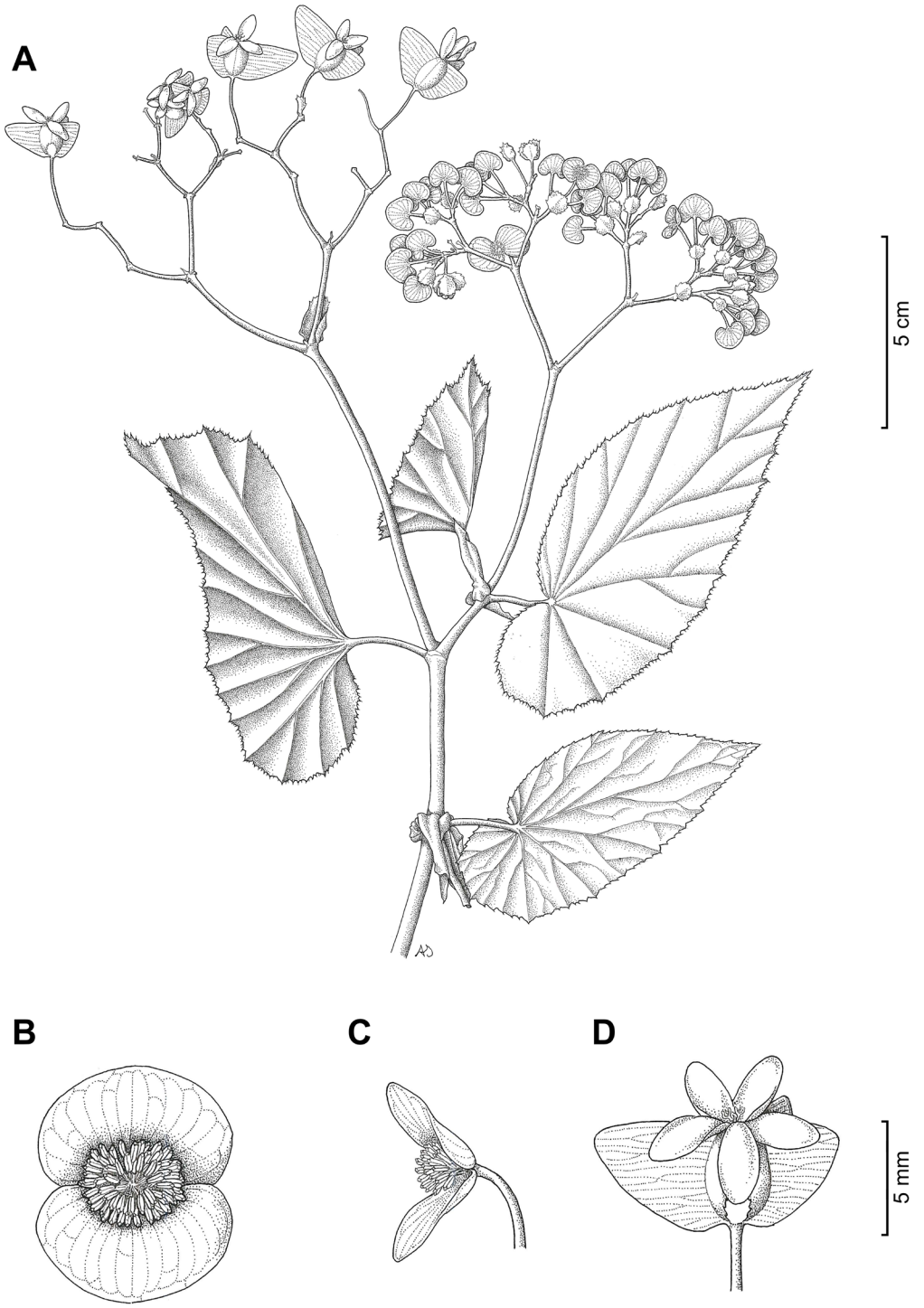


**Fig. 39.** *Begonia subspinulosa* Irmsch. **A**. Habit, showing pistillate flowers with five tepals. **B**. Staminate flower, front view. **C**. Staminate flower, side view. **D**. Pistillate flower, front-side view, sowing a pistillate flower with five tepals. Illustration by Anna Dorward from *H.E. Moore, A. Salazar C., E.E. Smith 8601bis* (US; A–C) and *F.L. Herrera 1151* (US; D).

beneath the ovary, oblanceolate to obovoid, 3–8 × 1–7 mm, apex rounded to truncate, translucent, colour unknown, glabrous, margin lacerate, ciliate; tepals 3 or 5, subequal, persistent in fruit, spreading, elliptic to ovate, 3–7 × 1.5–4.5 mm, apex acute, pink, glabrous, margin entire, aciliate; ovary body ovoid, ca 4 × 2.5–4 mm, colour unknown, glabrous, unequally 3-winged, wings triangular, largest 4–7 × 3–15 mm, smallest 4–6 × 1–3 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 1.5–3.5 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 18 mm long. *Fruit body* ovoid, not expanding, drying brown, wings same shape as in ovary, the largest expanding to 10 × 18 mm, the smallest expanding to 9 × 8 mm.

**Proposed conservation assessment**

Previously assessed as Data Deficient (DD) by León & Monsalve (2006). Known from two populations, both along major roads that have been significant centres of deforestation in the past decade. The EOO of *B. subspinulosa* is ca 1115 km$^2$, so we assess *B. subspinulosa* this species as Endangered (EN B1ab(iii)).

**Notes**

The protologue of *B. subspinulosa* states that there are four tepals on the species' pistillate flowers. We have dissected several flowers of this species, including from isolectotypes, and only found pistillate flowers with three or five tepals.

**Typification notes**

In the protologue of *B. subspinulosa*, Irmscher cited duplicates of *A. Weberbauer 7836*, *7836*$^a$, and *F.L. Herrera 1171* variously housed at B, F, and US herbaria but did not specify a holotype (Irmscher 1949: 592). It is therefore appropriate to designate a lectotype. Most of the cited specimens are of high quality with well-pressed leaves, flowers, and fruit. We designate a sheet of *A. Weberbauer 7836*$^a$ held at B (B100365202) as the lectotype of *B. subspinulosa* as it is particularly well mounted and with high quality dissections.

**Identification notes**

*Begonia subspinulosa* is the only member of the stenotepala group that has been collected with fewer than five tepals on the pistillate flower, though it usually has five.

*Begonia subspinulosa* is most similar to *B. alto-peruviana* and *B. brevicordata* (see Identification notes for *B. alto-peruviana*). It could also be confused with *B. stenotepala* or *B. deltoides* sp. nov., both of which have strongly persistent stipules. It differs from both in its white to pink tepals (vs orange, red, or brown) with rounded to acute apices (vs acuminate or long-acuminate apices) and from *B. deltoides* sp. nov. in its transversely ovate rather than deltoid leaf laminae. The leaf margins of *B. subspinulosa* are serrulate while those of *B. stenotepala* are entire to serrulate but the teeth of *B. stenotepala* are barely perceptible compared to the obvious, sharp-looking teeth of *B. subspinulosa*.

**Distribution and ecology**

Endemic to Peru and known from Cusco and Puno Regions (Fig. 35C). Found at an elevation of 1200–2150 m a.s.l. in lower and middle montane forest.

***Begonia*** sect. ***Donaldia*** (Klotzsch) A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 127 (de Candolle 1859). – *Donaldia* Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854). – **Type**: lectotype: *Donaldia ulmifolia*

(Willd.) Klotzsch ≡ *Begonia ulmifolia* Willd., designated by Swart, Index Nominum Genericorum Card 09630).

**Notes**

*Begonia* sect. *Donaldia* is, in many respects, similar to *B.* sect. *Ruizopavonia*. The two sections both have pinnate venation, two tepals on the staminate flower, and winged ovaries and fruits. In Peru, the two sections can be distinguished by the number of tepals in the pistillate flower: five in *B.* sect. *Donaldia* and two in *B.* sect. *Ruizopavonia*, but *B. nunezii* Moonlight sp. nov. and Bolivian members of the latter section can also have five tepals. When sterile, the two sections can be distinguished in Peru by their indumentum. The lower leaf lamina of *B. ulmifolia* is densely tomentose but the lower leaf laminae of all Peruvian species of *B.* sect. *Ruizopavonia* are glabrous, though they can have an indumentum on the veins on the underside of the leaves.

The number of species in *Begonia* sect. *Donaldia* was increased from two to three by the inclusion of *B. gesnerioides* L.B.Sm. & B.G.Schub. by Moonlight *et al.* (2018). We reduce the number of species to two once more, by treating this species as a synonym of *B. ulmifolia*. This change was discussed but not in formalised Moonlight *et al.* (2018).

### 26. ***Begonia ulmifolia*** Willd.

Figs 40, 41

*Species plantarum* 4 (1): 418 (Willdenow 1805). – *Donaldia ulmifolia* (Willd.) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854). – **Type**: VENEZUELA • Caracas, La Venta, "In America meridionali"; *F.W.H.A. von Humboldt 690*; lectotype: B [BW17571020, BW17571010], designated by Smith (1973: 217); isolectotypes: P [P01900835, P00679511].

Link (1822: 396); Loddiges & sons (1822: pl. 638); Hooker (1823: t. 57); Humboldt *et al.* (1825: 179); Otto & Dietrich (1836: 356); Klotzsch (1855: 198); Walpers (1858: 908); de Candolle (1864: 290); Schulz (1911: 3); Smith & Wasshausen (1989: 44); Jacques & Mamede (2005: 585).

*Begonia dasycarpa* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 127 (de Candolle 1859). – **Type**: BRAZIL – **Bahia State** • 1851; *L. Dupasquier s.n.*; lectotype: G-DC [F neg. 7324], **designated here**.

de Candolle (1861: 341, 1864: 291); Jacques & Mamede (2005: 585).

*Begonia gesnerioides* L.B.Sm. & B.G.Schub., *Publications of the Field Museum of Natural History, Botanical Series* 13 (4/1): 190 (Smith & Schubert 1941a). – **Type**: PERU – **San Martín Region** • Juanjuí, Alto río Huallaga; [7°11′ S, 76°46′ W]; 400–800 m a.s.l.; Apr. 1936; *G. Klug 4296*; holotype: GH [GH00068236]; isotypes: BM [BM000832011], F [V0042321F], K [K001089509], MO [MO-2264384], NY [NY03091036], P [P05586479], S [S04-727], U [U0000718], UC [UC709875], US [US00115323]. **Syn. nov.**

Brako & Zarucchi (1993: 192); León & Monsalve (2006: 166).

*Begonia jairi* Brade, *Arquivos do Jardim Botânico do Rio de Janeiro* 10: 135 (Brade 1950). – **Type**: BRAZIL – **Espírito Santo State** • Estrada de Ferro Vitória-Minas Gerais, entre Boa Vista e Estação Pedro Palácio; *J. Vieira & J. Mendoça 44*; holotype: RB [RB00536704, RB00538019]; isotypes: HB.

Jacques & Mamede (2005: 585).

**Etymology**

Named for the superficial resemblance of the species' leaves to those of species of elm (*Ulmus* L., Ulmaceae).

### Specimens examined

PERU – **San Martín Region: Prov. Huallaga** • Cascadas de Shima, ca 45 minute walk towards waterfall from trail mouth; 6°53′56″ S, 76°50′07″ W; 521 m a.s.l.; 5 Feb. 2016; *P.W. Moonlight & A. Daza 183*; MOL, E [E00885871] • ibid. 6°53′57″ S, 76°50′02″ W; 466 m a.s.l.; 5 Feb. 2016; *P.W. Moonlight & A. Daza 184*; MOL, E [E00885870].

### Description

Caulescent herb, to 50 cm high. *Stem* erect, branching; internodes to 5 cm long, to 3 mm thick, succulent, brown, sparsely to densely tomentose. *Stipules* persistent, narrowly-lanceolate, 6–12 × 2–2.5 mm, apex

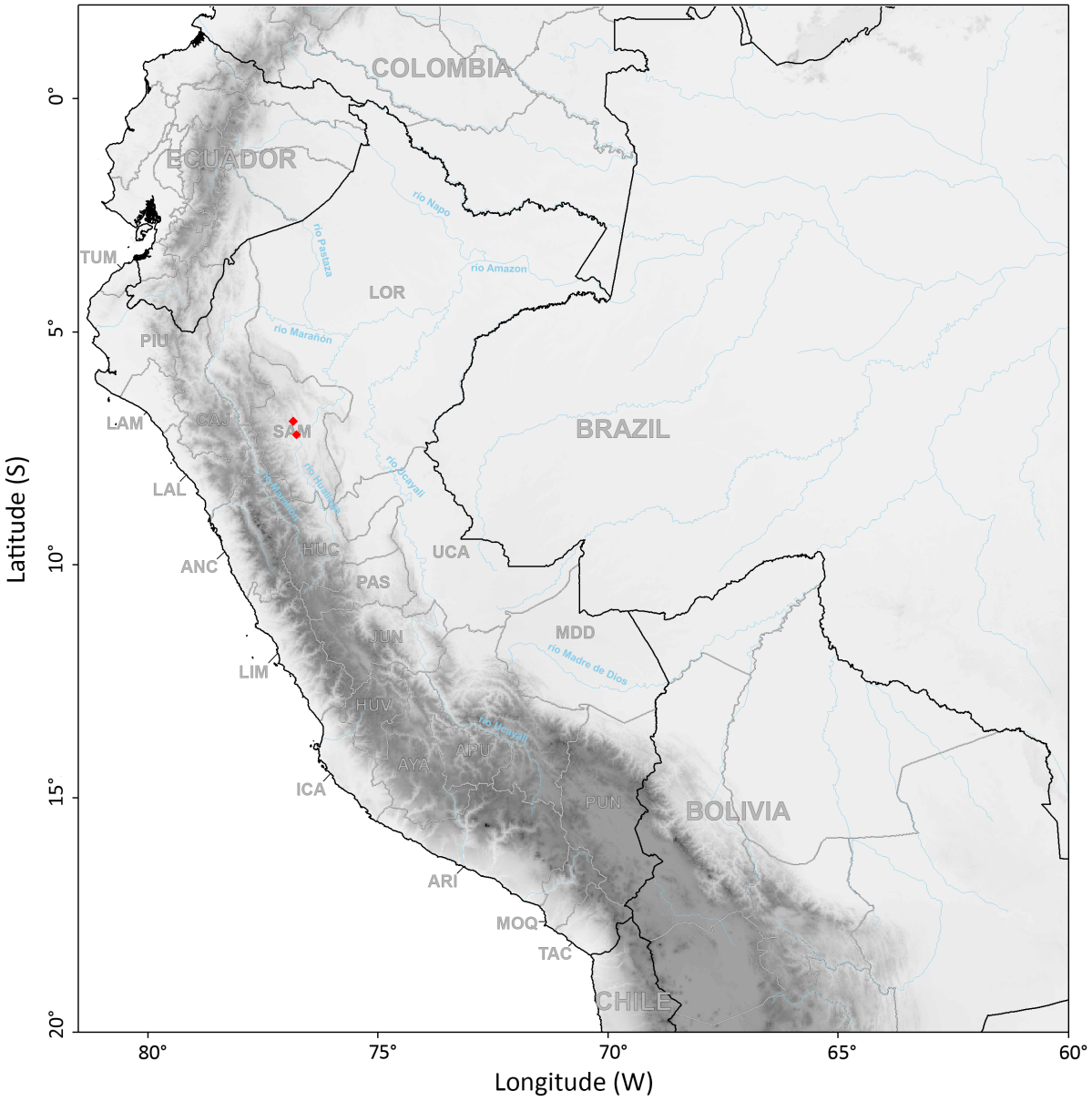


**Fig. 40.** Distribution of *Begonia* sect. *Donaldia* (Klotzsch) A.DC. in Peru and surrounding countries, *B. ulmifolia* Willd. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.


**Fig. 41.** Reproduction of an illustration of *Begonia ulmifolia* Willd. by Joseph Swan from *Exotic Flora* 1: t. 57 (Hooker, 1823) from the copy at the Royal Botanic Garden Edinburgh.

acuminate, translucent, pale brown, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 1–2.5 cm long, brown, densely tomentose; blade asymmetric, oblanceolate, to 15 × 4.5 cm, membranaceous, apex broadly acuminate, base oblique, rounded on the broader side, cuneate on the narrow side, margin dentate to serrate, sparsely ciliate, upper surface green, pilose to sparsely pilose, lower surface pale green, sparsely tomentose, tomentose on the major veins pinnate, with 4–7 secondary veins on the larger side, 4–6 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 4 branches, bearing up to 16 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 7 cm long, red, tomentose, bracts persistent, elliptic, 3–8 × 0.5–1.5 mm, translucent, brown, glabrous, apex acuminate, aristate, margin entire, aciliate. *Staminate flowers*: pedicels to 10 mm long, sparsely tomentose; tepals 2, spreading, ovate, 8–9 × 5–7 mm, apex obtuse, white, tomentose on the outer surface, margin entire, aciliate; stamens ca 25, spreading, yellow, filaments 1–2 mm long, free, cuboid, ca 1 × 0.5 mm, dehiscing via lateral slits, connectives extending to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles 2, positioned directly beneath the ovary, lanceolate, 1–3.5 × 0.5 mm, apex truncate, translucent, green flushed red, glabrous, margin entire, aciliate; tepals 5, subequal, deciduous in fruit, spreading, ovate, 3.5–5 × 2–3.5 mm, apex obtuse, white, sparsely pilose on the outer surface, margin entire, aciliate; ovary body ovoid, 3.5–5 × 1.5–3 mm, white or green flushed red, tomentose, unequally 3-winged, the largest wing triangular, 4–6 × 2–4 mm, smallest rib-like ca 1 mm wide; 3-locular, placentae branches divided, bearing ovules between the laminae; styles 3, yellow, free, 1–2 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 15 mm long. *Fruit body* ovoid, to 9 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding to 12 × 15 mm, the smallest expanding to 2 mm wide.

**Proposed conservation assessment**

Known from a single population in Peru but widespread and locally common in its extra-Peruvian distribution and found in numerous protected areas. We assess *B. ulmifolia* as Least Concern (LC), which replaces the Endangered (EN B1a) assessment of *Begonia gesnerioides* by León & Monsalve (2006).

**Synonymy notes**

*Begonia gesnerioides* is newly synonymised with *B. ulmifolia* herein. Prior to this publication, *B. gesnerioides* was known only from the type collection made in 1936. In preparation for this manuscript, we were able to visit the type locality and collect sterile individuals from this population. Phylogenetic work published by Moonlight *et al.* (2018) shows that this population is nested within *B. ulmifolia* and examination of the type, new collections, and the protologue of *B. gesnerioides* shows that it is indistinguishable from the broad circumscription of *B. ulmifolia* provided by Jacques & Mamede (2005). Accordingly, we synonymise *B. gesnerioides* with *B. ulmifolia*. Following Jacques & Mamede (2005), our circumscription of *B. ulmifolia* also includes *B. dasycarpa* A.DC. and *B. jairi* Brade.

**Typification notes**

The protologue of *B. ulmifolia* cites specimens collected "in America *meridionali*" by F.W.H.A. von Humboldt but no herbarium or collection number (Willdenow 1805: 418). This name was therefore in need of lectotypification. L.B. Smith (1973: 217) later cited a duplicate of the collection *F.W.H.A. von Humboldt 690* held in B as the "holotype" of *B. ulmifolia*. In 1973, this citation was sufficient to merit an effective lectotypification. There are two sheets of this collection held in Berlin (BW17571020 and BW17571010) but as they are labelled as sheets one and two, they can both be considered the same duplicate and therefore the same lectotype.

A.P. de Candolle did not cite any specimens of *B. dasycarpa* in the protologue for this species, citing only "In Brasilæ Prov. Bahiensi" (de Candolle 1859: 127). It is therefore appropriate to designate a

lectotype for this species. A.P. de Candolle (1864: 290) repeated the same citation with the addition of the collector name "Dupasquier" with no herbarium cited again. A specimen whose label includes the name Dupasquier is present in G herbarium (F neg. 7324). This specimen was collected in Bahia state in 1851 and is a good match for A.P. de Candolle's description of *B. dasycarpa*, hence we designate it as the lectotype of this species. We note that the label of this specimen also includes the name "Mr Goudot" next to the date 1859. This is written in a different hand to the rest of the label so may mean that the specimen was sent to or from Mr Goudot in Paris in 1859. The same combination of "Dupasquier" and "Goudot" is written on the label of the type specimen of *B. neocomensium* A.DC. but has generally been interpreted as "Du Pasquin". We believe this name refers to the Lyon botanist L. Dupasquier who made collections of several *Begonia* species in Bahia.

**Identification notes**

Within Peru, *B. ulmifolia* is superficially most similar to *B. buddleiifolia*, which also has straight, pinnately nerved leaves and a dense indumentum on its vegetative parts. When flowering, the two species can easily be distinguished by their inflorescence structure. *Begonia ulmifolia* has an axillary inflorescence, which is a symmetrical cyme, whereas *B. buddleiifolia* has a terminal inflorescence, which is thyrsoid and asymmetrical. Sterile specimens of *B. buddleiifolia* may be determined by the bullate leaf lamina, which contrasts with the smooth lamina of *B. ulmifolia*.

**Distribution and ecology**

Native to Trinidad and Tobago, Venezuela, Guyana, Colombia, and Brazil and introduced elsewhere. Within Peru, known from a single population in Huallaga Province, San Martín Region (Fig. 40). Found in semi-deciduous forest at an elevation of 400–800 m a.s.l.; where it is found on stream sides.

***Begonia*** sect. ***Doratometra*** (Klotzsch) A.DC.

*Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 383 (de Candolle 1864). – *Doratometra* Klotzsch, *Gattungen und Arten* 1854: 127 (Klotzsch 1855). – **Type**: holotype: *Doratometra wallichiana* Klotzsch = *Begonia wallichiana* Lehm.

**Synonymy notes**

For a full list of sectional synonyms, see Moonlight *et al.* (2018).

**Notes**

A small section of diminutive, annual, or short-lived species of *Begonia*. Within Peru, the section is represented by two species which are distinguished from *B.* sect. *Ephemera* by their palmate-pinnate rather than palmate venation.

27. ***Begonia humilis*** Dryand. in Aiton (1789)
Figs 42A, 43

*Hortus Kewensis* 3: 353 (Dryander 1789). – **Type**: TRINIDAD AND TOBAGO • Cultivated in Saint Vincent from seed collected in Trinidad; *Anderson s.n.*; lectotype: LINN [LINN-HS1474-3-1], **designated here. –** COUNTRY UNKNOWN • Cultivated in Mr Lee's Garden; 1788; *coll. unknown s.n.*; syntype: LINN [LINN-HS1474-3-2].

Dryander (1791: 166); Link (1822: 396); Otto & Dietrich (1836: 359); Fisch. *et al.* (1842: 51); Klotzsch (1855: 157); Walpers (1858: 883); de Candolle (1861: 343, 1864: 297); Schulz (1911: 26); Smith & Schubert (1941a: 193, 1952: 38); Smith (1973: 215); Smith & Wasshausen (1979: 238, 1986: 9, 1989: 52); Brako & Zarucchi (1993: 193); Vásquez *et al.* (2005: 112–125).

*Begonia lucida* Haw. *Saxifragearum Enumeratio*: 197 (Haworth 1821a). – **Type**: TRINIDAD AND TOBAGO • Cultivated in Saint Vincent from seed collected in Trinidad; *Anderson s.n.*; neotype: LINN [LINN-HS1474-3-1], **designated here**.
de Candolle (1861: 343); Schulz (1911: 27).

*Begonia subhumilis* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 124 (de Candolle 1859). – **Type**: ECUADOR – **[Prov. Guayas]** • Guayaquil, Las Bodegas; *coll. unknown 8*; holotype: K [K000536756]; isotype: B [B10036204].
de Candolle (1864: 298); Smith & Wasshausen (1979: 238).

*Begonia pavoniana* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 142 (de Candolle 1859). – **Type**: PERU • 1778; *H. Ruiz & J.A. Pavón s.n.*; lectotype: B [B100507473, F neg. 20808], designated by Moonlight & Jara-Muñoz (2017: 21); isolectotype: OXF.
de Candolle (1864: 381); Schulz (1911: 27).

*Begonia guyanensis* var. *cearensis* C.DC., *Bulletin de L'Herbier Boissier II* 1: 315 (de Candolle 1901). – **Type**: BRAZIL – **Ceará State** • *C. Huber 206*; holotype: G.
Smith & Wasshausen (1984: 467).

*Begonia lokobeensis* Humb., *Bulletin du Muséum National d'Histoire Naturelle Sér. 3, Botanique* 1 (45): 80 (Humbert 1972). – **Type**: MADAGASCAR • Nossi-Bé: Sambirano, Lokobe; Nov. 1932; *Perrier de la Bâthie 18708*; holotype: P [P00137255]; isotype: P [P00137256].

*Begonia alemanii* Brade, *Rodriguésia* 9: 30 (Brade 1945). – **Type**: BRAZIL – **Ceará State** • *F. Allemão & M. de Cysneiros 1352*; holotype: R [R000037072, R000037072a]; isotype: RB [RB00536658].
Jacques & Mamede (2005: 582).

*Begonia hirsuta* Ruiz ex Klotzsch (nom. inval.; nom. rej. pro syn. *Pilderia hirsuta* Klotzsch (nom. inval.; nom. nud.) *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854).
de Candolle (1864: 381); Schulz (1911: 27).

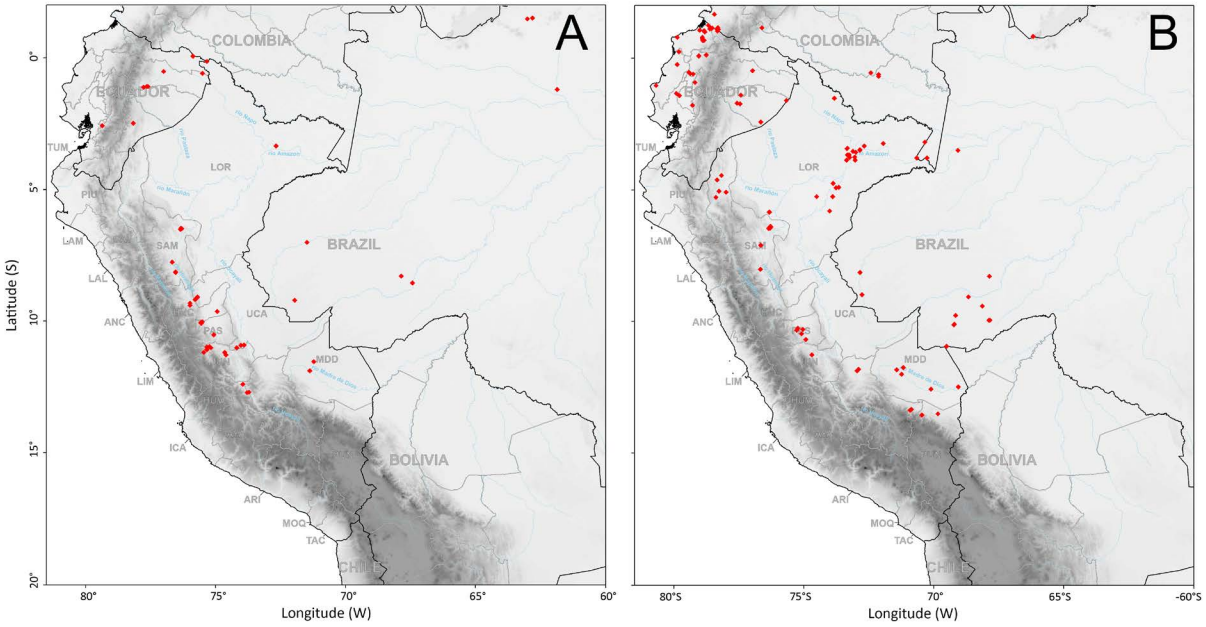


**Fig. 42.** Distribution of *Begonia* sect. *Doratometra* (Klotzsch) A.DC. in Peru and surrounding countries. **A**. *B. humilis* Dryand. (red). **B**. *B. semiovata* Liebm. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

*Pilderia hirsuta* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854).

*Begonia haematotricha* hort ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia humilis* var. *porteriana* (Fisch, C.A.Mey & Avé-Lall.) A.DC.), *Flora Brasiliensis* 4 (1): 344 (de Candolle 1861).

*Pilderia erythrotricha* Klotzsch ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia humilis* var. *porteriana* (Fisch, C.A.Mey & Avé-Lall.) A.DC.), *Flora Brasiliensis* 4 (1): 344 (de Candolle 1861).

*Begonia hirsuta* hort. ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia humilis* Dryand.), *Flora Brasiliensis* 4 (1): 346 (de Candolle 1861).

*Begonia hirsuta* Pav. ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia pavoniana* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 381 (de Candolle 1864).

de Candolle (1864: 381); Schulz (1911: 27).

*Begonia hitchcockii* auct. non Irmsch: R.Vásquez *et al.*, *Arnaldoa* 12 (1–2): 112–125 (Vásquez *et al.* 2005).

*Begonia humilis* var. *porteriana* (Fisch., C.A.Mey. & Avé-Lall.) A.DC. pro parte in A.DC. *Flora Brasiliensis* 4 (1): 344 (de Candolle 1861); pro parte in A.DC. *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 298 (de Candolle 1864).

*Begonia semiovata* Liebm. pro parte in R.Vásquez *et al.*, *Arnaldoa* 12 (1–2): 112–125 (Vásquez *et al.* 2005).

**Etymology**

The epithet is formed from the Latin word '*humilis*' meaning 'lowly' or 'humble' and refers to the small stature of the species.

**Selected specimens examined**

PERU – **Loreto Region: Prov. Loreto** • río Yanayacu, campamento Palizada; 5°03′03″ S, 74°12′4″ W; 90 m a.s.l.; 3 Nov. 1992; *C. del Carpio & J. Ruiz 1633*; USM. – **San Martín Region: Prov. San Martín** • Dist. Tarapoto, Prope Tarapoto; [6°27′ S, 76°20′ W]; Jun. 1855; *R.E. Spruce 3982*[a]; BM, K [2], NY, TCD • Dist. Tarapoto, 10.6 km from junction in road that goes to río Huallaga; 6°30′ S, 76°21′ W; 530 m a.s.l.; 10 Apr. 1984; *T.B. Croat 58093*; MO [MO-2180398], USM • Route from Tarapoto to Tocache; 7°44′36″ S, 76°40′03″ W; 894 m a.s.l.; 6 Feb. 2016; *P.W. Moonlight & A. Daza 188*; E [E00885890], MOL. – **[Prov. Tocache]** • Dist. Tocache Nuevo, Vicinity of Tocache; 400–700 m a.s.l.; 1979; *J. Schunke V. 11028*; MO [MO-1642628], US [US00672844] • Dist. Tocache, Balsa probana (margen derecha del río Huallaga); [8°08′ S, 76°32′ W]; 24 Sep. 1970; *J. Schunke V. 4447*; COL, G, NY [2], US [US00222168] • Dist. Tocache, Quebrada de Pólvora, 10 km abajo de Puerto Pizana (margen derecha del río Huallaga); [8°07′ S, 76°32′ W]; 1 Jun. 1970; *J. Schunke V. 4950*; NY [2], US [US00222161]. – **Ucayali Region: Prov. Padre Abad** • Boquerón km 228; [9°04′ S, 75°42′ W]; 460 m a.s.l.; 10 Aug. 1943; *C.A. Ridoutt 12986*; MO [MO-1642528], USM [3] • Dist. Padre Abad, Boquerón de Padre Abad; 9°04′47″ S, 75°42′10″ W; 450 m a.s.l.; 8 Feb. 2016; *P.W. Moonlight & A. Daza 202*; E [E00885888], MO, MOL. – **Prov. Atalaya** • road from Puerto Ocopa to Atalaya, ca km 107; 10°53′43″ S, 73°54′08″ W; 623 m a.s.l.; 15 Feb. 2016; *P.W. Moonlight & A. Daza 248*; E [E00885895], MO, MOL, P • 105 km from Las Cavernas on trail from Paujil; 10°54′06″ S, 74°01′22″ W; 633 m a.s.l.; 14 Feb. 2016; *P.W. Moonlight & A. Daza 247*[a]; E [E00885887], G, MO, MOL. – **Huánuco Region: Prov. Leoncio Prado** • Dist. Rupu Rupu, Tingo María, limestone hills opposite airport; 9°18′ S, 75°59′ W; 9 Dec. 1981; *T. Plowman, M. Ramírez R. & T.M. Perry* 11243 (USM • Dist. Mariano Dámaso Berau, Bello• [9°23′ S, 75°59′ W]; 750 m a.s.l.; 31 May 1967; *M. Fukushima 6530*; HUT, US [US00222159]. – **Prov. Puerto Inca** • Panguana; 9°37′ S, 74°56′ W; 21 Jan. 1983; *F.G. Seidenschwarz 205/1*; US [US00424974]. – **Huánuco-Ucayali Region** • La Divisoria; [9°10′ S, 75°47′ W]; 5 Aug. 1965; *A. Aldave & M. Fernández 5616*; HUT. – **Pasco Region: Prov. Oxapampa** • Dist. Pozuzo, route from

Pozuzo to Codo de Pozuzo; 10°00′22″ S, 75°30′31″ W; 655 m a.s.l.; 20 Feb. 2016; *P.W. Moonlight & A. Daza 286*; E [E00885569], MO, MOL • Dist. Pozuzo; [10°04′ S, 75°33′ W]; 1778–1788; *H. Ruiz & J.A. Pavón s.n.*; MA [MA813500] • Dist. Palcazú, Atrás de la Escuela de nivel secundario San Pedro de Pichanaz, camino a la montaña; 10°30′17″ S, 75°04′08″ W; 633 m a.s.l.; 1 Apr. 2017; *A. Orejuela & J. Castillo 2933*; E [E01053425], USM. – **Junín Region: Prov. Chanchamayo** • río Paucartambo Valley, near Perene Bridge; [10°57′ S, 75°14′ W]; 700 m a.s.l.; 19 Jun. 1929; *E.P. Killip & A.C. Smith 25370*; NY, US [US0222309] • La Merced; [11°04′ S, 75°20′ W]; ca 700 m a.s.l., 29 May–5 Jul. 1929; *E.P. Killip & A.C. Smith 23713*; NY, US [US00222312] • Hacienda Genoa; [11°05′ S, 73°25′ W] ca 1600 m a.s.l.; 2 Jul. 1962; *F. Woytkowski 7361*; K, MO [MO-1642501], US [US00222167]. – **Prov. Tarma** • San Luis; 13 Aug. 1944; *C.A. Ridoutt 14525*; USM • Camino Ramazuy a San Luis; 16 Aug. 1944, *C.A. Ridoutt s.n.*; USM [2]. – **Prov. Concepción** • San José; 18 Aug. 1944; *C.A. Ridoutt 14587*; USM. – **Prov. Satipo** • La Molina University Field Station, ca 10 km N of Satipo on 5S, ca 1 km E of field station; 11°10′12″ S, 74°58′54″ W; 782 m a.s.l.; 20 Jun. 2014; *P.W. Moonlight & A. Daza 21*; E [E00724455], MOL • 5 km SE of Satipo on road to Mazamari; [11°16′ S, 74°36′ W]; 620 m a.s.l.; 24 May 1979; *D.C. Wasshausen & F. Encarnación 1093*; K, MO [MO-1642522], US [US00222155], USM. – **Ayacucho Region: Prov. La Mar** • Along new road between Hacienda Luisiana and Santa Rosa Bridge; 12°23′ S, 73°47′ W; ca 585 m a.s.l.; 7 Jun. 1968; *T.R. Dudley 9089*; MO [MO-1642527] • Along río Marantari, a tributary of río Apurimac, below Santa Rosa Bridge; [12°41′ S, 73°43′ W]; 580 m a.s.l.; 28 May 1975; *D.C. Wasshausen & F. Encarnación 483*; K, US [US00222160] • Between Tambo, San Miguel, Ayna and the Hacienda Luisiana; ca 12°52′ S, 73°47′ W; 15 Aug. 1968; *T.R. Dudley 11719*; F, US [US00222163]. – **Madre de Dios Region: Prov. Madre de Dios** • Manu, Parque Nacional del Manu, alrededores de la estación Cocha Cashu; 11°52.8′ S, 71°22.9′ W; 350 m a.s.l.; 12 Oct. 1983; *Y. Mäkinen & R. Kalliola 1792*; USM.

**Description**

Caulescent herb, to 50 cm high. *Stem* erect, branching; internodes to 5 cm long, to 5 mm thick, succulent, green to red, glabrous. *Stipules* persistent, lanceolate, 4–10 × 2–4 mm, apex acute, translucent, white, glabrous, margin entire, ciliate. *Leaves* > 3, alternate, basifixed; petiole 1–5.5 cm long, green to red, glabrous to villous; blade asymmetric, lanceolate, to 11.5 × 4.5 cm, succulent, acuminate, base obliquely truncate to obliquely cordate, basal lobes not overlapping, sinus to 6 mm deep, margin double serrate, ciliate, upper surface green, glabrous to sparsely pilose, lower surface pale green to red, glabrous, veins palmate but with 1 primary vein, 5–9 veined from the base, with 1–4 secondary veins on the larger side, 1–2 on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 2 branches, bearing up to 4 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 4 cm long, red, glabrous, bracts persistent, lanceolate to ovate, 1.5–5 × 0.5–2 mm, translucent, white, glabrous, apex rounded to acute, margin entire, ciliate. *Staminate flowers*: pedicels to 11 mm long, glabrous; tepals 2, spreading, circular, 2–4 × 2–4 mm, apex obtuse rounded, white, glabrous, margin entire, aciliate; stamens 8–10, projecting, yellow, filaments 0.5–1 mm long, free, anthers linear, 0.5–1.5 × 0.2 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 7 mm long; bracteoles 2, directly beneath the ovary, lanceolate, 1.5–2 × 0.75–1.5 mm, translucent, white, glabrous, apex acute, margin entire, ciliate; tepals 5, subequal, persistent in fruit, spreading, elliptic to ovate, 1–2.5 × 0.5–2 mm, apex obtuse, white, glabrous, margin entire, aciliate; ovary body ovoid, 2–4 × 1–2 mm, white, glabrous, unequally 3-winged, wings triangular, largest 4–8 × 1–4 mm, smallest 2–7 × 4–2 mm; 3-locular, placentae branches entire, bearing ovules on both surfaces; styles 3, yellow, free, 1–2 mm long, once-divided, stigmatic papillae n a spirally twisted band. *Fruiting pedicel* to 10 mm long. *Fruit body* ovoid, to 9 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding to 10 × 10 mm, the smallest expanding to 10 × 6 mm.

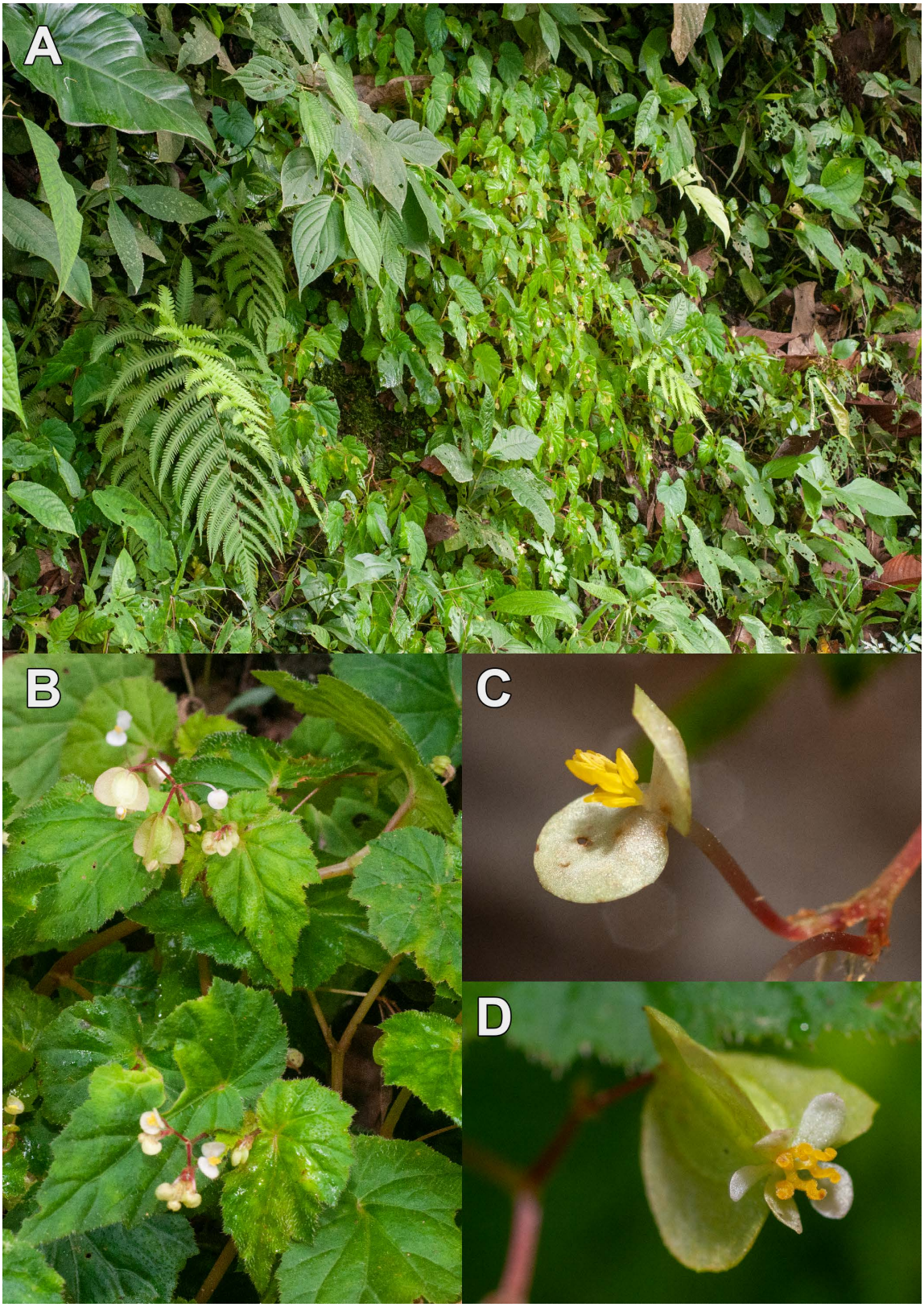


**Fig. 43.** *Begonia humilis* Dryand. **A**. Habitat. **B**. Habit. **C**. Staminate flower. **D**. Pistillate flower flowers. All photographs taken by P.W. Moonlight from *P.W. Moonlight & A. Daza 247a* in Atalaya Province, Ucayali Region.

**Proposed conservation assessment**

Widespread and common in Peru and across its range, which includes much of the Caribbean and Amazonia. Frequent in disturbed areas, including next to roads, and found in numerous protected areas. We assess *B. humilis* as Least Concern (LC).

**Notes**

Smith & Schubert (1941a) described the placentae of *B. humilis* as varying from entire to divided. We have dissected several fruits of Peruvian individuals *B. humilis* and have only observed entire placentae. This may be due to confusion with the highly similar species *B. hirtella*, which has divided placentae, or simply because we have dissected a biased selection of ovaries.

**Synonymy notes**

*Begonia haematotricha* hort. Boiss and *Pilderia erythrotricha* Klotzsch were both cited by Alphonse Pyramus de Candolle as synonyms of his *B. humilis* var. *porteriana* (Fisch., C.A.Mey. & Avé-Lall.) A.DC. based upon annotations by Klotzsch in Berlin herbarium (de Candolle 1861: 344). As such, they are both rejected names. We cite them in the synonymy of *B. humilis* because all specimens we have seen annotated with either name are clearly this taxon. De Candolle's variety is excluded from this treatment (see Excluded names) but included as a pro parte synonym of *B. humilis* because of these specimens.

The only known material of *B. humilis* collected by H. Ruiz and J.A. Pavón are three sheets housed in Madrid, Berlin, and Oxford herbaria. The sheets in Berlin and Oxford are labelled as *B. hirsuta*, a name they also used for our concept of *B. hirta*. Ruíz's diaries state they wrote a description of *B. hirsuta* in Muña, but this probably applies to *B. hirta*, which they collected there. Ruiz's diaries state that they wrote a description of *B. purpurea* earlier in Pozuzo. This likely refers to *B. humilis* because the habitat here is suitable and the name matches that on an illustration housed in Madrid. In 1788, the same year Ruiz and Pavón returned from their travels, O. Swartz published the name *B. purpurea* Sw. for a species found in Jamaica (Swartz 1788: 86). Perhaps Ruiz and Pavón saw this publication and were aware this name was now unavailable because the herbarium sheet they prepared for Madrid herbarium is labelled as *B. glabra*. Unknown to most of the botanical world, this name was unavailable too due to the earlier publication of *B. glabra* Aubl. (Aublet 1775: 916), a name that remained overlooked throughout much of the 1800s. Ruiz and Pavon's names *B. glabr*a, *B. hirsuta* and *B. purpurea* all remain unpublished names.

**Typification notes**

The protologue of *B. humilis* states the species is found in the West Indies (Dryander 1789: 353), citing Scottish botanist Alex Anderson, who was at that time the superindendent of the government botanic garden in Saint Vincent. Anderson sent most of his herbarium specimens to Joseph Banks, and they are now in the herbarium of the British Museum. Despite a thorough search, we have not been able to find any specimens collected by Anderson in BM herbarium. The protologue of *B. humilis* also cited living material grown by James Lee and Lewis Kennedy in 1788, who had a nursery in Hammersmith in London. In their preparatory work for the Flora of Venezuela, Smith & Wasshausen (1979) stated that the type of *B. humilis* was "probably in BM" and in 1984 the same authors cited a specimen in the BM that was grown in Kew Gardens as the holotype. If this sheet can be located, then this citation is an effective lectotypification. Smith & Wasshausen (1984) were probably referring to a sheet with three specimens and three separate barcodes (BM001008469, BM001008470, BM001008471). The only text written on this sheet is written in pencil and says "Dryand! *Begonia humilis* Hort. Kew. iii 353". This suggests that Dryander saw the sheet and used it to describe *B. humilis*; however, this sheet is not cited in the protologue, so it is original material rather than a syntype. The herbarium of the Linnean society contains a sheet with two collections, the first grown in the "Garden at St Vincent" by "Mr Anderson"

from seeds from Trinidad (LINN-HS1474-3-1) and a second from "Mr Lee's Garden, 1788" (LINN-HS1474-3-2). These specimens match the citation in the protologue so are syntypes of *B. humilis*. Syntypes take priority over uncited original material in lectotype designation (Turland *et al.* 2018: Article 9.12) so it is appropriate to designate a lectotype from among the syntypes that supersedes Smith & Washausen's effective lectotypfication (Turland *et al.* 2018: Article 9.19). We select *A. Anderson s.n.* (LINN-HS1474-3-1) as the lectotype because its wild origins are known.

Adrian Hardy Haworth described *B. lucida* Haw. as resembling *B. humilis* but with slightly different flowers, including a longer peduncle (Haworth 1821a: 197). This description was based upon living material grown in Chelsea, London, and originating in Trinidad. Haworth's specimens were distributed between Kew and Oxford herbaria, but most of the specimens in Oxford were discarded by Fielding. We have not seen any specimens resembling *B. humilis* in either Kew or Oxford that were cultivated in Chelsea or collected in Trinidad before 1821. It is therefore appropriate to designate a neotype of this name. We follow de Candolle (1861) and Schulz (1911), who both included *B. lucida* as a synonym of *B. humilis* so select *A. Anderson s.n.*; (LINN [LINN-HS1474-3-1]) as a neotype. This is the lectotype of *B. humilis* so it ensures *B. lucida* will remain a synonym of *B. humilis*.

**Identification notes**

Recognised in Peru as a small annual or short-lived perennial with palmate-pinnate venation and stipules with long-ciliate margins.

**Distribution and ecology**

Known from Dominca, Jamaica, Saint Vincent, Trinidad and Tobago, French Guiana, Suriname, Guyana, Venezuela, Colombia, Ecuador, Peru, Bolivia, and Brazil. Within Peru, known from Loreto, San Martín, Ucayali, Huánuco, Pasco, Junín, Ayacucho, and Madre de Dios Regions (Fig. 42A). Found in Amazonia and lower montane forests at an elevation of 90–1500 m a.s.l. *Begonia humilis* appears to be an annual species and is typically found in the shade of dense forest along watercourses or on wet banks.

### 28. ***Begonia semiovata*** Liebm.
Figs 42B, 44

*Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjöbenhavn* 1852: 22 (Liebmann 1852). – **Type**: NICARAGUA • In monte Mombacho; [14°50′ N, 85°48′ W]; 609 m a.s.l.; Jan. 1845–1848; *A.S.* Ørsted *209*; lectotype: C [C10008294, F neg. 21708], designated by Smith (1973: 215).

Walpers (1858: 941); de Candolle (1864: 382); Standley (1937: 745); Smith & Schubert (1946b: 77, 1958: 56); Smith (1973: 215); Smith & Wasshausen (1979: 238, 1986: 8, 1989: 46); Brako & Zarucchi (1993: 195); Vásquez *et al.* (2005: 112–125); Burt-Utley (2015: 80).

*Begonia humilis* var. *glabrata* Seem., *Botany of the Voyage of H.M.S. Herald* 4: 128 (Seeman 1854). – **Type**: PANAMA • Chagras; 1 Apr. 1840; *A. Fendler 297*; lectotype: BM, **designated here**; isolectotypes: B [F neg. 20913], BM, G-DC ex Petrop., GH [GH00068164], K [2: K000536734, K000536734], MO [MO-510279], US [US00115313].

de Candolle (1859: 142).

*Begonia flexuosa* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 142 ( de Candolle 1859). – **Type**: PANAMA • Chagras; 1 Apr. 1840; *A. Fendler 297*; lectotype: K [K000536734] **designated here**; isolectotypes: B [F neg. 20913], BM, G-DC ex Petrop., GH [GH00068164], K [K000536734], MO [MO-510279], US [US00115313].

de Candolle (1864: 382); Standley (1937: 745).

*Begonia guyanensis* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 142 (de Candolle 1859). – **Type**: GUYANA • Guyana; 1837; *M.R. Schomburgk 334*; lectotype: G-DC, **designated**

**here**; isolectotypes: BM [BM001191444], K [K000536762], G [F neg. 24184], OXF, TCD [TCD0005565] • BRAZIL • Ad Rio Negro; *C.F.P.S. Martius s.n.*; syntype [n.v., herbarium unkown].
de Candolle (1864: 381); Standley (1937: 745).

*Begonia spruceana* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 142 (de Candolle 1859). – **Type**: PERU – **[San Martín Region: Prov. Tarapoto]** • Prope Tarapoto; [6°27′ S, 76°20′ W]; 1855–1856; *R. Spruce 4211*; lectotype: G-DC [F neg. 7330], **designated here**; isolectotypes: K [K000006050, K000006048], TCD [TCD0005556] • COLOMBIA • Prov. De Barbawas; [Santa Barbara?], 250 m a.s.l.; 1851–1857; *J.J. Triana s.n.*; syntype: BM.
de Candolle (1864: 381); Smith & Schubert (1941a: 199, 1946b: 78).

*Begonia rosea* A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 299 (de Candolle 1864). – **Type**: COSTA RICA • Aguarate; 1857; *C. Hoffman 730*; holotype: B [B100243069].
Smith & Schubert (1946b: 78).

*Begonia guyanensis* var. *glaberrima* C.DC. ex Donn.Sm., *Botanical gazette* 20: 540 (Smith 1895). – **Type**: COSTA RICA • Jiménez, Llanos de Santa Clara, Comarca de Limón; 200 m a.s.l., Apr. 1804; *J.D. Smith 4814*; lectotype: G, **designated here**; isolectotypes: GH [GH00068170], US [US00115327].
Smith & Schubert (1946b: 78).

*Hoffmannella rosea* Klotzsch ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia rosea* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 299 (de Candolle 1864).

*Begonia filipes* auct. non Benth.: Brako & Zarucchi, *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: 192 (Brako & Zarucchi 1993).

*Begonia meyeniana* Walp. pro parte in A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 395 (de Candolle 1864).

*Begonia meyeniana* Walp. pro parte in O.E.Schulz in Urban, *Symbolae Antillanae* 7 (1): 27 (Schulz 1911).

*Begonia meyeniana* Walp. pro parte in L.B.Sm. & Wassh., *Phytologia* 54 (7): 468 (Smith & Wasshausen 1984).

*Begonia humilis* Dryand. pro parte in R.Vásquez *et al.*, *Arnaldoa* 12 (1–2): 112–125 (Vásquez *et al.* 2005).

### Etymology

Named for the distinctive, semi-circular wings of its ovary and fruit.

### Selected specimens examined

PERU – **Loreto Region: Prov. Maynas** • Dist. Putumayo, Inventario Rápido ’25, Campamento Medio Campuya; 1°31′03.4″ S, 73°48′58.2″ W; 135–200 m a.s.l.; 27 Oct. 2012; *M. Ríos, N. Dávila, I. Huamantupa, W. Trujillo & C. Vriesendorp 2833*; F [V0387176F] • Yanamoto, Explorama tourist Camp, río Amazonas above mouth of río Napo; 3°28′ S, 72°50′ W; 120 m a.s.l.; 28 Dec. 1982; *A.H. Gentry & L. Emmons 38753*; MO [MO-1641529], USM • Dist. Iquitos, río Itaya, Nueva Esperanza, trail to Peña Negra; [3°52′ S, 73°21′ W]; ca 110 m a.s.l.; 19 Dec. 1974; *S. McDaniel 19489*; MO [MO-1641464], NY, US [US00222298]. – **Prov. Mariscal Ramón Castilla** • Dist. Pebas, Pacaurquillo, Pevas; [3°14′ S, 71°56′ W]; 25 Oct. 1980; *F. Ayala, J. Torres, A. del Castillo & R. Pérez 2716*; MO [MO-1641451]. – **Prov. Alto Amazonas** • Northwest slopes of Cerros Campanquiz, río Marañón just above Pongo de Manseriche; [4°27′ S, 77°35′ W]; 250–350 m a.s.l.; 17 Oct. 1962; *J.J. Wurdack 2281*; K, NY, US [US00222300], USM • Balsapuerto; [5°50′ S, 76°19′ W]; 220 m a.s.l.; Jan. 1933; *G. Klug 2840*; BM, K, MO [MO-1641492], NY, US [US00222305] • Between Yurimaguas and Balsapuerto (lower rio Huallaga basin); [5°51′ S, 76°19′ W]; 135–150 m a.s.l.; 26–31 Aug. 1929; *E.P. Killip & A.C. Smith 28091*; NY, US [US00222306]. – **Prov. Requena** • Dist. Sapuena, Basin of río Ucayali, Jenaro Herrera and vicinity, Supay Cocha, Quebrada Braga, entrance at 2 ½ hour upstream by 25 h.p. outboard from Jenaro herrea;

4°55′ S, 73°45′ W; 25 Nov. 1988; *D.C. Daly, D. Maytehuari, H. Pacaya, L. Vilchez, O. Mozombite, D. Angulo & R. Canayo 5763*; K, MO [MO-1641460], NY, US [US0022289] • Dist. Puinahua, reserva nacional Pacaya-Samira (cuenca del Pacaya), Cocha Yarina, Caño Alfaro; 5°15′ S, 74°30′ W; 80–200 m a.s.l.; 4 Jul. 1987; *C. Grández & J. Ruiz 1142*; MO [MO-1641468], US [US00672840] • Canal Iberia, ca 5 km from río Tepiche; [5°48′ S, 74°00′ W]; 18 Oct. 1968; *S. McDaniel & B. Marcos 11338*; MO [MO-1641530], NY. – **Prov. Loreto** • Dist. Nauta, Reserva Nacional Pacaya-Samiria, quebrada Pucate; 4°44′57″ S, 73°51′56″ W; 128 m a.s.l.; 6 Nov. 2008; *R. Vásquez, C. Davidson, S. Davidson, R. Rojas, L. Valenzuela, F. Díaz & A. Peña 34603*; HOXA, MO [MO-2218454] • Dist. Nauta, río Yanayacu, compimento Palizada; 5°03′03″ S, 74°12′04″ W; 90 m a.s.l.; 3 Nov. 1992; *C. Del Carpio, O. Toyan & J. Ruiz 1633*; MOL. – **Prov. Ucayali** • Dist. Pampa Hermosa, Parque Nacional Cordillera Azul, PV106 Boca Pauya, río Cushabatay; 7°04′07.6″ S, 75°51′42.4″ W; 368 m a.s.l.; 29 May 2018; *L. Valenzuela, J. Flores, G. Shareva, R. Villacorta & R. Macedo 35415*; USM. – **Amazonas Region: Prov. Bagua** • Path to east of Kuzu Grande, accessed via petroleum extraction site; 5°02′24″ S, 78°15′41″ W; 350 m a.s.l.; 30 Jan. 2016; *P.W. Moonlight & A. Daza 131*; E [E00885570], MOL • Road from Bagua towards Santa Maria de Nieva, between El Muyo and Mesones Muro; 5°16′54″ S, 78°22′31″ W; 512 m a.s.l.; 30 Jan. 2016; *P.W. Moonlight & A. Daza 127*; E [E00885573], MOL. – **Prov. Condorcanqui** • río Cenepa, outskirts of Huampami; [4°27′ S, 78°10′ W]; 292 m a.s.l.; 2 Oct. 1972; *B. Berlin 165*; MO [MO-285204], NY, USM. – **Prov. Condorcanqui** • Dist. El Cenepa, Comunidad de Mamayaque, Cabecera de la quebrada Saasá; 4°37′03″ S, 78°19′57″ W; 560 m a.s.l.; 13 Aug. 1997; *R. Vásquez & E. Quiaco 24530*; HUT, MO [MO-286205], MOL, NY, US [US00672837] • Bajo Cachiaco, río Nieva; [5°05′ S, 77°59′ W]; 8 Dec. 1997; *J. Albán, B. Millán, N. Malca & R. Apanú 9861*; E [E01007274], MO [MO-2991020]. – **San Martín Region: Prov. San Martín** • Route from Tarapoto to Yurimaguas; 6°22′53″ S, 76°16′49″ W; 394 m a.s.l.; 4 Feb. 2016; *P.W. Moonlight & A. Daza 172*; E [E00885899], MOL • Dist. Tarapoto, km 40–42 entra la via Tarapoto-Yurimaguas; 6°24′20.3″ S, 76°15′52.7″ S, 375 m a.s.l.; 14 Feb. 2017; *A. Orejuela, J. Castillo & M. Cueva 2787*; USM); [Dist. Tarapoto], Tarapoto ad saxa rivulorum; [6°27′ S, 76°20′ W]; *R. Spruce s.n.*; K. – **Prov. Mariscal Cáceras** • Angashyacu ±10 km de Juanjui margen derecha Huallaga; [7°06′ S, 76°39′ W]; 300–400 m a.s.l.; 25 Aug. 1948; *R. Ferreyra 4583*; USM. – **[Prov. Tocache]** • Dist. Tocache, camino a Santa Rosa (margen derecha del río Mishollo); [8°01′ S, 76°40′ W]; 350–750 m a.s.l.; 5 Aug. 1973; *J. Schunke V. 6715*; MO [MO-1641519], NY, USM. – **Pasco Region: Prov. Oxapampa** • Dist. Palcazú, Puente Pan de Azúcar, camino a playa caliente; 10°15′10″ S, 75°13′28″ W; 304 m a.s.l.; 8 Jun. 2008; *R. Rojas, L. Chuck & C. Rojas 5695*; HOXA, USM • Dist. Palcazú, Comunidad Nativa San Pedro de Pichanaz, Sector Azulis, cercanías del central comunal; 10°28′12″ S, 75°04′60″ W; 480 m a.s.l.; 24 Sep. 2005; *A. Monteagudo M., A. Peña, R. Francis, H. Chamorro, L. Quicha & A. Pascual* 10167 (HOXA, MO [MO-2183950], US [US00951208], USM • Pichis Trail, San Nicolas; [10°41′ S, 74°55′ W]; ca 1100 m a.s.l.; 4–5 Jul. 1929; *E.P. Killip & A.C. Smith 26050*; NY, US [US00222308]. – **Junín Region: Prov. Satipo** • 2 km S of Satiopo; [11°16′ S, 74°38′ W]; ca 700 m a.s.l.; 24 Jun. 1977; *J.C. Solomon 3283*; MO [MO-1642541]. – **Madre de Dios Region: Prov. Manu** • río Manu, Cocha Cashu Station; 11°50′ S, 71°25′ W; 350 m a.s.l.; 15 Aug. 1984; *R.B. Foster 9829*; F, MBM, MO [MO-1641504], NY, USM • Cocha Cashu uplands; 11°45′ S, 71°10′ W; 400 m a.s.l.; 19 Aug. 1986; *P. Núñez 5833*; MO [MO-163447] • Pakitsa, guard post, entrance to Manu Park; [12°00′ S, 71°14′ W]; 360 m a.s.l.; 26 Oct. 1979; *A.H. Gentry, J. Aronson, J. Terborgh & R. Ramirez 27255*; MO [MO-1641533]. – **Prov. Tambopata** • Las Piedras, Cusco Amazónico; 12°28′ S, 69°03′ W; 200 m a.s.l.; 6 Sep. 1991; *M. Timaná & A. Rubio* 2229 (MO [MO-1641496]. – **Cusco Region:** río Arasa; 1066 m a.s.l.; [13°22′ S, 70°54′ W]; 7 Jun. 1943; *C. Sandeman 3702*; K, OXF • **Prov. La Convención** • Campamento Malvinas; 11°52′12″ S, 72°56′28″ W; 455 m a.s.l.; 20 Sep. 1997; *P. Acevedo R., P. Núñez & F. Ramírez 9838*; US [US00594422], USM • Prov. La Convención, Dist. Echarate, Segakiato in the Camisea River, lower Urubamba Region; 11°47′30″ S, 72°53′00″ W; 320 m a.s.l.; 2 Oct. 1997; *P. Núñez, P. Acevedo & M. Chuspe 20999*; US, USM. – **Prov. Quispicanchis** • Cadena; [13°20′ S, 70°51′ W]; 1020 m a.s.l.; 29–30 Jul. 1946; *J.C. Vargas Calderón 6170*; CUZ, MO [MO-1641487], US [US00222302]. – **Prov. Paucartambo** • Keros; [13°01′ S, 71°26′ W]; 750 m a.s.l.;

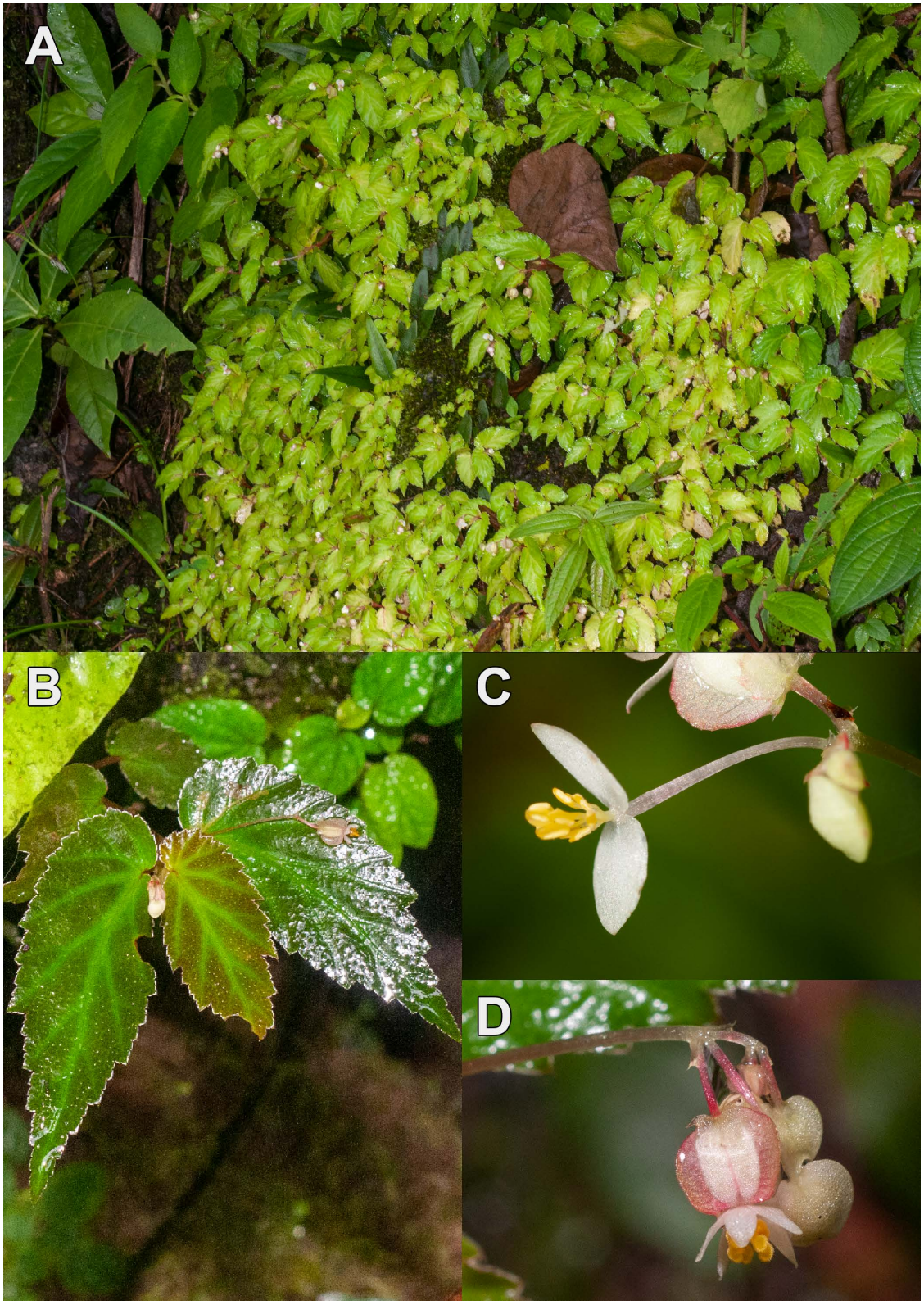


**Fig. 44.** *Begonia semiovata* Liebm. **A**. Habitat. **B**. Habit. **C**. Inflorescence, showing pistillate flower. **D**. Inflorescence, showing staminate flower. All photographs taken by P.W. Moonlight from *P.W. Moonlight & A. Daza 172* (A–C) in San Martín Province, San Martín Region and *127* (D) in Bagua Province, Amazon Region.

*J.C. Vargas Calderón 17871*; US [US00222295]. – **Puno Region: Prov. Carabaya** • lowland rainforest along roadside in the vicinity of San Gabán; [13°33′ S, 70°27′ W]; 900 m a.s.l.; 12 Jun. 1982; *D.C. Wasshausen & A. Salas 1253*; K, MO [MO-1641461], US [US00222292] • río Candamo fila at mouth of río Guacamayo; 13°30′ S, 69°50′ W; 700–800 m a.s.l.; 24 May 1992; *A.H. Gentry, C. Reynel, R. Ortiz & P. Núñez 77114*; MO [MO-098140], USM.

### Description

Caulescent herb, to 30 cm high. *Stem* trailing to erect, branching; internodes to 7 cm long, to 3 mm thick, sometimes branching at the lower nodes, succulent, pale green to red, glabrous. *Stipules* late deciduous, lanceolate, 3–9 × 1.5–3 mm, apex acuminate, translucent, pale green, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 0.5–1.6 cm long, pale green to red, glabrous; blade asymmetric, lanceolate, to 8 × 3 cm, membranaceous, apex acute to acuminate, base cordate on the broad side of the blade, the basal lobe overlapping the petiole, cuneate on the narrow side of the blade, margin double serrate, ciliate, upper surface green, usually with a silver line around the edge of the lamina, glabrous, lower surface pale green to red, glabrous, veins pinnate, with 4–7 secondary veins on the larger side, 3–4 secondary veins on the smaller side. *Inflorescences* 1–5, bisexual, axillary, erect, cymose, with 2 branches, bearing up to 4 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 2.2 cm long, green to red, glabrous, bracts persistent, lanceolate, 0.5–1 × 0.2–0.5 mm, translucent, white, glabrous, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 8 mm long, glabrous; tepals 2, spreading, ovate to spherical, 2–3 × 2–3 mm, apex rounded, white, glabrous, margin entire, aciliate; stamens ca 15, spreading, yellow, filaments 0.5–1.5 mm long, free, anthers ovoid, ca 0.5 × 0.3 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 7 mm long; bracteoles 2, positioned directly beneath the ovary, obovate, ca 1 × 1 mm, apex truncate, translucent, white, glabrous, margin lacerate, ciliate; tepals 5, subequal, persistent in fruit, spreading, ovate, 1–2 × 0.5–2 mm, apex obtuse, white, glabrous, margin entire, aciliate; ovary body ovoid, 1.5–3 × 1.5–3 mm, white to pale green, glabrous, sub-equally 3-winged, wings semi-circular, 2–4 × 1–2 mm; 3-locular, placentae branches divided in the largest locule, entire in the two smallest locules, bearing ovules on both surfaces; styles 3, yellow, free, 0.5–1.5 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 7 mm long. *Fruit body* ovoid, to 5 × 3 mm, drying brown, wings same shape as in ovary, expanding to 5 × 3 mm tall.

### Proposed conservation assessment

Widespread and often common in its Peruvian, South American and Central American range, which includes numerous protected areas. We assess *B. semiovata* Liebm. as Least Concern (LC).

### Notes

In their *Begonia* accounts for the floras of Ecuador and Peru, Smith & Schubert (1941a: 193; 1986: 9) described the placentae of *B. spruceana* A.DC. (a synonym of *B. semiovata*) as “variable even within the same ovary”. We have dissected five individuals of Peruvian *B. semiovata* and their placentae were consistent: divided in the largest locule, and entire in the smallest two locules.

### Typification notes

The protologue of *B. semiovata* cites material collected by Anders Sandøe Ørsted at 2000 feet on Mombacha volcano in Nicaragua (Liebmann 1852: 22). Smith (1973) cited *C.A. Ørsted s.n.* in Copenhagen as the holotype of this name. There is only one specimen in Copenhagen that could be considered to match this citation, so this was an effective lectotypification.

Alphonse Pyramus de Candolle described *B. flexuosa* A.DC. based upon the collection *A. Fendler 297* but did not cite an herbarium (de Candolle 1859: 142). De Candolle also cited material identified

as *B. humilis* var. *glabrata* Seem., which is an unpublished name. The only duplicate of *A. Fendle*r 297 that we know of that has this annotation is the duplicate in Kew (K000536734). This sheet has a determination slip by de Candolle, which also cites the protologue of *B. flexuosa* citation. We designate this duplicate the lectotype of *B. flexuosa*.

*Begonia guyanensis* A.DC. was described based upon two collections: *M.R. Schomburgk 334* from Guyana and *C.F.P.S Martius s.n.* from the Rio Negro in Brazil (de Candolle 1859: 142). We have not been able to locate the Brazilian collection but are aware of several duplicates of the Guyanan collection. We designate a duplicate in the Candolle herbarium as the lectotype of *B. guyanensis*. This collection includes notes by de Candolle, which indicates he used this duplicate to describe the name.

The protologue of *B. spruceana* cited the collection *R. Spruce 4211* and an unnumbered collection made by José Jerónimo Triana (de Candolle 1859: 142). We have only seen one of Triana's collections that matches de Candolle's description and the Spruce collection, which is *J.J. Triana s.n.* in the British Museum (BM). This collection has no annotations by de Candolle so is not an ideal lectotype. There are four known sheets of *R. Spruce 4211*, which also lack annotations by de Candolle. We designate the duplicate in the de Candolle herbarium (F neg. 7330) as the lectotype of *B. spruceana* herein because de Candolle saw this duplicate.

John Donnell Smith described *B. guyanensis* var. *glaberrima* C.DC. ex Donn.Sm. based upon the collection *J.D. Smith 4814* from Costa Rica (Smith 1895: 540). No herbarium was cited, so it is appropriate to designate a lectotype. Duplicates exist in G, GH, and US but as de Candolle was based in Geneva, we designate the duplicate in G as the lectotype of *B. guyanensis* var. *glaberrima* herein.

**Identification notes**

*Begonia semiovata* and *B. humilis* are diminutive, annual species commonly encountered in lowland Amazonian Peru. The two species are best distinguished by their stipules, which are entire in both species but are aciliate in *B. semiovata* and ciliate in *B. hirtella.* Both species fruit throughout the year and the fruit wings are semi-circular in *B. semiovata* but triangular in *B. humilis*.

**Distribution and ecology**

Known from Honduras, Guatemala, Nicaragua, Costa Rica, Panama, Trinidad and Tobago, Venezuela, Guyana, French Guiana, Colombia, Ecuador, Peru, and Brazil. Within Peru, known from Loreto, Amazonas, San Martín, Huánuco, Pasco, Junín, Madre de Dios, Cuzco, and Puno Regions (Fig. 42B). Found in Amazonian and lower montane forest at an elevation of 90–1100 m a.s.l. *Begonia semiovata* is mostly found on riverbanks or other slopes in humid lowland rainforest. It appears to be a short-lived or annual species.

### ***Begonia*** sect. ***Ephemera*** Moonlight

*Taxon* 67(2): 291 (Moonlight *et al.* 2018). – **Type**: holotype: *Begonia exigua* Irmsch.

**Notes**

This section was described by Moonlight *et al.* (2018) to accommodate a well-supported clade of annuals or short-lived perennials native to central and South America. This section is most similar to *B.* sect. *Doratometra* but, in Peru, can be distinguished by its palmate rather than palmate-pinnate venation.

29. ***Begonia fischeri*** Schrank
Figs 45A, 46

*Plantae Rariores Horti Academici Monacensis* 2: pl. 59 (Schrank 1820). – **Type**: BRAZIL – **[Rio de Janeiro State]** • prope urbem Rio de Janeiro; [22°56′ S, 43°13′ W]; *C.F.P. Martius s.n.*; lectotype: M [M-0145727], **designated here**; probable isolectotype: NY [NY00453926].

de Candolle (1861: 346, 1864: 359); Smith & Wasshausen (1979: 246, 1984: 466, 1986: 48, 1989: 57); Brako & Zarucchi (1993: 192); Vásquez *et al.* (2005: 112–125); Wasshausen *et al.* (2014: 384); Burt-Utley (2015: 42); Delfini (2017: 8).

*Begonia pauciflora* Lindl., *The Botanical Register* 6: t. 471 (Lindley 1820). – **Type**: lectotype: plate 471 in Lindl., *The Botanical Register* 6: t. 471 (Lindley 1820), **designated here**.

Haworth (1821a: 197); Golding & Karegeannes (1984: 497).

*Begonia palustris* A.Hartw. ex Benth., *Plantas Hartwegianas Imprimis Mexicanas*: 184 (Bentham 1845). – *Begonia tovarensis* var. *palustris* (A.Hartw. ex Benth.) L.B.Sm. & B.G.Schub., *Caldasia* 4 (17): 89 (Smith & Schubert 1946b). – *Begonia fischeri* var. *palustris* (A.Hartw. ex Benth.) Irmsch. (nom. inval.), *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 24 (Irmscher 1953). – **Type**: COLOMBIA • Ad fossas prope Popayan; [2°27′ N, 76°13′ W]; *A. Hartweg 1022*; lectotype: K [K000536747], **designated here**; isolectotypes: B [B100242105, F neg. 20902], BM [BM001008549], E [E00299537], K [K000536748], LD [LD1404597], OXF, P [P05495336, P06841694, P06841698].

de Candolle (1864: 303); Jacques & Mamede (2005: 581).

*Begonia vellerea* Klotzsch, *Gattungen und Arten* 1854: 152 (Klotzsch 1855). – **Type**: BRAZIL • Serra de Estrella; *F. Sellow* 2190; lectotype: B [B100243043, F neg. 20899], **designated here**.

Walpers (1858: 881); de Candolle (1861: 348, 1864: 302); Smith & Smith (1971: 49); Barkey & Golding (1974: 136) [as ‘vallerea’; Smith & Wasshausen (1984: 471)].

*Begonia malvacea* Klotzsch, *Gattungen und Arten* 1854: 153 (Klotzsch 1855). – *Begonia fischeri* var. *malvacea* (Klotzsch) Irmsch. (nom. inval.), *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 24 (Irmscher 1953). – **Type**: BRAZIL • *F. Sellow s.n.*; lectotype: B [B101068567], **designated here**.

Walpers (1858: 881); de Candolle (1864: 302); Smith & Schubert (1950: 245); Jacques & Mamede (2005: 580).

*Begonia pohliana* Klotzsch, *Gattungen und Arten* 1854: 153 (Klotzsch 1855). *Begonia macroptera* var. *pohliana* (Klotzsch) A.DC., *Flora Brasiliensis* 4 (1): 346 (de Candolle 1861). – **Type**: BRAZIL • *Pohl 1832*; lectotype: B [B100242113], designated by Jacques & Mamede (2005: 580); isolectotypes: K [K000536642], W [W0057221] • *F. Sellow 446*; syntype: B [B100242112].

Walpers (1858: 881); de Candolle (1861: 346, 1864: 301); Smith & Schubert (1950: 245); Smith & Wasshausen (1984: 469); Jacques & Mamede (2005: 581).

*Begonia brasiliensis* Klotzsch, *Gattungen und Arten* 1854: 154 (Klotzsch 1855). – *Begonia fischeri* var. *brasiliensis* (Klotzsch) Irmsch. (nom. inval.), *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 24 (Irmscher 1953). – **Type**: BRAZIL • Rio das Pedras; 1820; *F. Sellow 2191*; lectotype: B [B100242117, F neg. 20895], **designated here**; isolectotype: B [B100242116].

Walpers (1858: 881); de Candolle (1861: 347, 1864: 301); Smith & Schubert (1941b: 110, 1950: 245); Smith & Wasshausen (1984: 466); Jacques & Mamede (2005: 581).

*Begonia macroptera* Klotzsch, *Gattungen und Arten* 1854: 154 (Klotzsch 1855). – *Begonia fischeri* var. *macroptera* (Klotzsch) Irmsch. (nom. inval.), *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 24 (Irmscher 1953). – **Type**: BRAZIL – **Rio de Janeiro State** • 1835; *C. Gaudichaud-Beaupré 1068*; lectotype: B [B100242111], **designated here**; isolectotypes: G [F neg. 24193], G-DC, P [P06841785, P06841787], RB ex P [RB00052761], US ex P [US00115380, US00314166].

Walpers (1858: 881); de Candolle (1861: 345, 1864: 300); Smith & Schubert (1944: 80, 1950: 245); Brade (1957: 155); Smith & Wasshausen (1984: 112); Jacques & Mamede (2005: 580).

*Begonia elata* Klotzsch, *Gattungen und Arten* 1854: 155 (Klotzsch 1855). – *Begonia fischeri* var. *elata* (Klotzsch) Irmsch. (nom. inval.), *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 24 (Irmscher 1953). – **Type**: BRAZIL • *F. Sellow 135*; lectotype: B [B100242122, F neg. 20894], **designated here**, first stage designated by Jacques & Mamede (2005: 580); isolectotypes: B [B100242121, B100242123, B100242124, B100242125].

Walpers (1858: 882); de Candolle (1861: 345, 1864 : 301); Smith & Schubert (1950: 245); Smith & Wasshausen (1984: 466); Jacques & Mamede (2005: 580).

*Begonia ermanii* Klotzsch, *Gattungen und Arten* 1854: 155 (Klotzsch 1855). – *Begonia uliginosa* var. *ermanii* (Klotzsch) A.DC., *Flora Brasiliensis* 4 (1): 347 (de Candolle 1861). – *Begonia fischeri* var. *ermanii* (Klotzsch) Irmsch. (nom. inval.), *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 24 (Irmscher 1953). – **Type**: BRAZIL – **Rio de Janeiro State** • *Erman s.n.*; lectotype: B [B100242115, F neg. 20883]; **designated here**.

Walpers (1858: 881); de Candolle (1861: 347, 1864 : 302); Jacques & Mamede (2005: 581).

*Begonia setosa* Klotzsch, *Gattungen und Arten* 1854: 151 (Klotzsch 1855). – **Type**: BRAZIL • *F. Sellow s.n.*; lectotype: B [B100247920], **designated here**; isolectotypes: B [2: B101068569, F neg. 20898; B100247921] • ibid.; *F. Sellow 4385*; syntypes: B [B100247917, B100247918, B100247919].

Walpers (1858: 880); de Candolle (1861: 348, 1864: 302); Smith & Smith (1971: 52); Smith & Wasshausen (1983: 446).

*Begonia moritziana* Klotzsch (nom. illeg.; later homonym non Kunth & Bouché), *Gattungen und Arten* 1854: 151 (Klotzsch 1855). – *Begonia fischeri* var. *moritziana* (Klotzsch) Irmsch. (nom. inval.), *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 24 (Irmscher 1953). – **Type**: VENEZUELA • Colonia Tovar; [8°20′ N, 71°45′ W]; Dec.–Jan.; *J.W.K. Moritz 1705*; lectotype: B [B1010685554, F neg. 20901], **designated here**; isolectotypes: BM [BM001191433], K [K000536749].

Walpers (1858: 880); de Candolle (1864: 303); Smith & Schubert (1950: 245, 1958: 57); Smith & Wasshausen (1984: 469); Jacques & Mamede (2005: 581).

*Begonia tovarensis* Klotzsch, *Gattungen und Arten* 1854: 151 (Klotzsch 1855). – *Begonia fischeri* var. *tovarensis* (Klotzsch) Irmsch. (nom. inval.), *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 24 (Irmscher 1953). – **Type**: VENEZUELA • Cultivated (Hort. Berlin) from material collected in Venezuela; Jun. 1853; *H. Wagner s.n.*; lectotype: B [B100242120], designated by Delfini (2017: 8).

Walpers (1858: 880); de Candolle (1864: 303); Schulz (1911: 25); Standley (1937: 747); Smith & Schubert (1941a: 200, 1944: 80, 1946b: 88, 1950: 245, 1958 : 57); Smith & Wasshausen (1984: 467-470); Jacques & Mamede (2005: 581); Delfini (2017: 8).

*Begonia uliginosa* Schott ex Klotzsch, *Gattungen und Arten* 1854: 155 (Klotzsch, 1855). – **Type**: BRAZIL • *H.W. Schott 927*; lectotype: B [B100242118], **designated here** • ibid. [Brazil]; *H.W. Schott 928*; syntype: B [B100242119].

Walpers (1858: 882); de Candolle (1861: 347, 1864 : 301); Smith & Schubert (1950: 245); Smith & Wasshausen (1984: 470).

*Begonia macroptera* var. *paludum* A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 4: 346 ( de Candolle 1861). – **Type**: BRAZIL – **Bahia State** • *P. Salzmann 473*; holotype: G-DC.

de Candolle (1864: 301); Smith & Wasshausen (1984: 468); Jacques & Mamede (2005: 581).

*Begonia tovarensis* var. *ocanensis* A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 303 (de Candolle 1864). – **Type**: COLOMBIA **–[Dept. Norte de Santander]** • environs de Ocaña; [8°15′ N, 73°21′ W]; 1220 m a.s.l.; Sep. 1850; *L. Schlim 100*; lectotype: G-DC, **designated here**; isolectotypes: BM [BM001191434], K [K000536753], P [P05586606].

Smith & Schubert (1946b: 89, 1958 : 57); Smith & Wasshausen (1984: 470).

*Begonia ulei* C.DC., *Bulletin de L'Herbier Boissier II*: 313 (de Candolle 1908). – **Type**: BRAZIL – **Santa Catarina State** • Am wasserfall des Ribeirão Fresco bei Blumenau; [26°56′ S, 49°03′ W]; Feb. 1888; *E. Ule 772*; holotype: US [US00115483].

Smith & Wasshausen (1984: 470).

*Begonia hassleri* C.DC., *Bulletin de la Société botanique de Genève, Sér. 2* 8: 22 (de Candolle 1916). – **Type**: ARGENTINA – **Prov. Misiones: Dept. San Ignacio** • Oct. 1914; *E. Hassler 460*; lectotype: G [G00085120], designated by Delfini (2017: 9); isolectotype: G [G00085120].

Smith & Schubert (1941b: 112); Zanotti *et al.* (2020: 475).

*Begonia cilibracteola* C.DC., *Smithsonian Miscellaneous Collections* 69: 5 (de Candolle 1919). – **Type**: PANAMA • Ahorca Lagarto to Culebra; [9°07′ S, 79°44′ W]; 9 Mar. 1905; *J.F. Cowell 388*; lectotype: US [US00115281] **designated here**; isolectotypes: G, NY [NY00112266].

Smith & Schubert (1958: 57); Smith & Wasshausen (1984: 466).

*Begonia roraimensis* Tutin, *Journal of Botany, British and Foreign* 78: 251 (Tutin 1940). – **Type**: GUYANA • Roraima; 9 Dec. 1884; *E.F. Thurn 141*; holotype: K [K000536713]; isotypes: BM, US [US00062899].

Smith & Wasshausen (1984: 470).

*Begonia fischeri* var. *brevipilosa* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 98 (Irmscher 1953). – **Type**: BRAZIL – **Minas Gerais State** • *Keller s.n.*; holotype: B [B101068555].

Jacques & Mamede (2005: 581).

*Begonia fischeri* var. *crenato-glabra* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 98 (Irmscher 1953). – **Type**: BRAZIL – **[Rio de Janeiro State]** • Ipiranga, Apr. 1916, *Leuderwaldt s.n.*; lectotype: SP [SP000031], designated by Jacques & Mamede (2005: 581) • ibid.; Feb. 1916; *Leuderwaldt s.n.*; syntype: SP [SP000032] • Sao Paulo State; *F. Sello 135*; syntypes: B [B100242121, B100242122, B100242123, B100242124, B100242125].

Jacques & Mamede (2005: 581).

*Begonia fischeri* var. *crenulato-glabra* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 98 (Irmscher 1953). – **Type**: BRAZIL – **Minas Gerais State** • Pouso Alegre;[22°14′ S, 44°56′ W]; 2 May 1928; *Hoehne s.n.*; holotype: SP [SP000033].

Jacques & Mamede (2005: 581).

*Begonia fischeri* var. *klugii* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 99 (Irmscher 1953). – **Type**: PERU – **San Martín Region: [Prov. Moyabamba]** • Zepelacio [Jepelacio], near Moyobamba; [6°07′ S, 76°55′ W]; 1100–1200 m a.s.l.; Dec. 1933; *G. Klug 3389*; holotype: US [US00115310]; isotypes: B [B100242114], K [K000536751], MO [MO-1642840], S [S04-742], NY [NY00118703].

Smith & Wasshausen (1986: 49); Brako & Zarucchi (1993: 192); Jacques & Mamede (2005: 581).

*Begonia intercedens* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 97 (Irmscher 1953). – **Type**: BRAZIL – **Rio Grande do Sul State** • *H. von Ihering 399*; holotype: SP [SP000050].

Smith & Wasshausen (1984: 468); Jacques & Mamede (2005: 581).

*Begonia patula* Fisch. ex Hornem. (nom. illeg.; later homonym non Haw.), *Hortus Regius Botanicus Hafniensis, Supplement*: 108 (Hornemann 1819). – **Type**: unknown.

de Candolle (1861: 346); Smith & Wasshausen (1979: 246).

*Begonia obliqua* Vell. (nom. illeg.; later homonym non L.), *Florae Fluminensis Icones* 10: t. 48 (Vellozo 1831). – **Type**: lectotype: plate 48 in Vellozo, Fl. Flum. Icones 10: t. 48 (Vellozo 1831), designated by Jacques & Mamede (2005: 580).

Vellozo (1881: 406); Smith & Schubert (1950: 245); Smith & Wasshausen (1984: 469); Jacques & Mamede (2005: 580).

*Begonia parvifolia* Klotzsch (nom. illeg.; later homonym non Schott), *Gattungen und Arten* 1854: 153 (Klotzsch 1855). – **Type**: BRAZIL • *F. Sellow s.n.*; lectotype: B [B100242107, F neg. 20900], **designated here**. **Syn. nov.**

Walpers (1858: 881); de Candolle (1861: 349, 1864 : 303); Smith & Schubert (1950: 245); Irmscher (1953: 20).

*Begonia brasiliensis* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854).

*Begonia elata* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854).

*Begonia macroptera* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854).

*Begonia malvacea* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854).

*Begonia moritziana* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854).

*Begonia parvifolia* (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854).

*Begonia pohliana* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854).

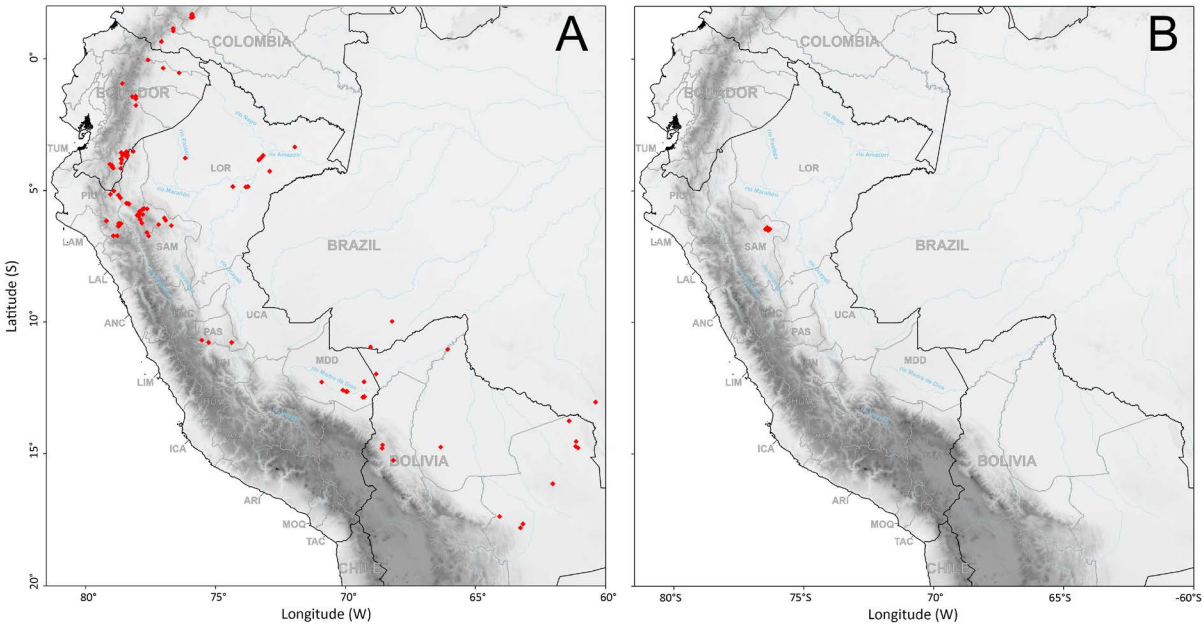


**Fig. 45.** Distribution of *Begonia* sect. *Ephemera* Moonlight in Peru and surrounding countries. **A**. *B. fischeri* Schrank (red). **B**. *B. hirtella* Link (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

*Begonia setosa* (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854).

*Begonia tovarensis* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854).

*Begonia vellerea* (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854).

*Begonia tovarensis* Moritz ex Klotzsch (nom. inval.*;* nom. rej. pro syn. *Begonia moritziana* Klotzsch), *Gattungen und Arten* 1854: 151 (Klotzsch 1855).

*Begonia patula* Haw. pro parte in A.DC., *Flora Brasiliensis* 4(1): 348 (de Candolle 1861); A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 302 (de Candolle 1864).

*Begonia lacustris* Wright ex Griseb. (nom. inval.; nom. rej. pro syn. *Begonia tovarensis* Klotzsch), *Catalogus Plantarum Cubensis*: 117 (Wright 1866).

*Begonia lacustris* Wright ex O.E.Schulz (nom. inval.; nom. rej. pro syn. *Begonia tovarensis* Klotzsch), *Symbolae Antillanae* 7 (1): 26 (Schulz 1911).

*Begonia villosa* auct. non Lindl.: Gardner, *London Journal of Botany* 1: 186 (Gardner 1842).

de Candolle (1861: 346); Smith & Wasshausen (1984: 471); Jacques & Mamede (2005: 581).

*Begonia patula* Haw. pro parte in Walp., *Repertorium Botanices Systematicae* 2: 215 (Walpers 1843a); pro parte in Walp., *Annales Botanices Systematicae* 4: 879 (Walpers 1858).

*Begonia patula* Haw. pro parte in Klotzsch, *Gattungen und Arten* 1854: 150 (Klotzsch 1855).

### Etymology

The protologue of *Begonia fischeri* cites "D. Ferd. Fischer in litt." and the epithet means Fischer's *Begonia*. We believe this refers to Friedrich Ernst Ludwig von Fischer.

### Selected specimens examined

PERU – **Loreto Region: Prov. Maynas** • Dist. Pebas, quebrada "tuye", margen derecha de río Ampiyacu, a 3 km del pueblo; [3°20′ S, 71°57′ W]; 13 May 1976; *J. Revilla 587*; US [US00222127] • Dist. Iquitos, Carretera de Peña Negra, margen de pasto; [3°50′ S, 73°20′ W]; ca 120–150 m a.s.l.; 20 Jan. 1984; *M. Rimachi Y. 7314*; MO [MO-2216528], US [US00424988] • Tamshiyacu, Quebrada Blanco, río Tahuayo; 4°15′ S, 72°55′ W; 135 m a.s.l.; 6 Apr. 1988; *J. Ruiz 1167*; K, MO [MO-1835887]. – **Prov. Loreto** • Tacsha Cocha, río Samiria; 4°50′ S, 74°20′ W; 130 m a.s.l.; 11 May 1985; *R. Vásquez, C. Grandez & N. Jaramillo 6502*; MO [MO-1642820] • Dist. Nauta-Parinari, Reserva Nacional Pacaya-Samiria, Centro de Datos Para la Conservación; 4°51′ S–5°12′ S, 73°50′ W–74°40′ W; 90 m a.s.l.; *C. del Carpio 2115*; MO [MO-1835886], MOL, USM. – **Prov. Requena** • Sapuena, Jenaro Herrera; 4°50′ S, 73°45′ W; 170 m a.s.l.; *R. Vásquez & N. Jaramillo 9601*; MO [MO-1835904], USM. – **Cajamarca Region: Prov. San Ignacio** • ruta San Francisco-San Ignacio; [5°00′ S, 78°55′ W]; 1600 m a.s.l.; 7 Jan. 1995; *S. Leiva G., P. Lezema A. & P. Chuna 1668*; MO [MO-1642828], NY [NY00454078] • Dist. Huarango, Poblado Huarandoza, Caserío El Edén; 5°09′38″ S, 78°44′19″ W; 1598 m a.s.l.; 30 Jul. 2007; *J. Perea & V. Flores 3515*; MO, US [US00990145] • Dist. San Ignacio, El Sauce, trocha entre la quebrada Orcón y la casa Adriano Correa; [6°08′ S, 79°12′ W]; 1700–1840 m a.s.l.; 18 Apr. 2003; *S. Baldeón M. & M. García O. 5271*; USM. – **Prov. Cutervo** • Beginning of path to Las Grutas; 6°13′59″ S, 78°43′58″ W; 2259 m a.s.l.; 26 Jul. 2014; *P.W. Moonlight & A. Daza 74*; E [E00835910], MOL • Pampa de La Rioja; [6°14′ S, 78°38′ W]; 2500 m a.s.l.; 30 Apr. 1992; *C. Ochoa & A. Salas 16097*; US [US00450297] • Margen izquierda del río Succino (Cutervo-Socota); [6°20′ S, 78°43′ W]; 1900 m a.s.l.; 23 May 1965; *A. López & A. Sagástegui 5325*; HUT, US [US00222126]. – **Prov. Chota** • Dist. Antes de Paccha; [6°30′ S, 78°25′ W]; 1950 m a.s.l.; 23 Jun. 1993; *J.G. Sánchez V. 870*; CPUN • **Prov. Santa Cruz**: Dist. Pulan,

Chacato; [6°42′ S, 78°56′ W]; 2600 m a.s.l.; 31 Jul. 2007; *L. Santa Cruz 1921*; USM • Dist. Pulan, Succhapampa; [6°42′ S, 78°57′ W]; 2600 m a.s.l.; 31 Apr. 2006; *L. Santa Cruz 298*; USM. – **Amazonas Region: Prov. Utcubamba** • Nuevo Mundo trail from Huarango (Cajamarca) to Pisaguas (Amazonas), ca 1 hr walk from crest at divide between Cajamarca and Amazonas; 5°15′40″ S, 78°39′42″ W; 1885 m a.s.l.; 28 Jan. 2016; *P.W. Moonlight & A. Daza 124*; E [E00885869], MOL. – **Prov. Bagua** • El Porvenir, trail to Sunsunza; 5°28′05″ S, 78°25′36″ W; 1094 m a.s.l.; 10 Jul. 1998; *R. Castro et al. 19493*; MO [MO-2991147] • Dist. Amargo, Nueva Esperanza, camino hacia la Catarata; 5°28′27″ S, 78°21′57″ W; 1261 m a.s.l.; 10 Feb. 2017; *A. Orejuela, M. Cueva & J. Castillo 2723*; E [E01053107], USM • Troca Nueva Esperanza a la catarata; 5°29′54″ S, 78°20′00″ W; 1650 m a.s.l.; 15 Dec. 2001; *R. Vásquez, R. Rojas & L. Campos 27337*; HUT, MO [MO-3009258]. – **Prov. Bongará** • 4 km N of Pocacochas on road to Rioja, trail down gorge to W of road; 5°40′ S, 77°22′ W; 2150–2200 m a.s.l.; 2 Jun. 1986; *S. Knapp, P. Alcorn, J. Mallet & H. Esley 7485*; MO [MO-1642821], US [US00672871], USM • Road from Florida to río Imaza; 5°55′09″ S, 78°00′37″ W; 1250 m a.s.l.; 31 Jan. 2016; *P.W. Moonlight & A. Daza 139*; E [E00885883], G, MOL • Vallée de l'Utcubamba, route de Chachapoyas a Pedro Ruíz, km 20–30; [6°05′ S, 77°54′ W]; Oct. 1990; *F. Khan & F. Moussa* 2789; USM [2]. – **Prov. Rodríguez de Mendoza** • Dist. Omia, Alrededores del río Tonchimiyo, El Dorado; 6°16'40–56.8"S, 77°11'26.9–27"W; 1260 m a.s.l.; 5 Jun. 2008; *V. Quipuscoa S., L. Cáceres M., I. Treviño Z. 4126*; HUT. – **Prov. Chachapoyas** • Quebrada Molina 5 km below Chachapoyas; [6°13′ S, 77°50′ W]; 2200–2400 m a.s.l.; 5 Jun. 1962; *J.J. Wurdack 748*; US [US00222124], USM • Dist. Leimebamba, camino a Monumentos Históricos de Pajatén; 6°34'23.76"S, 77°38'28.92"W; 1792 m a.s.l.; 28 Aug. 2004; *V. Quipuscoa S., M. Vílchez T. & W. Meza E. 3165*; HUT. – **San Martín Region: Prov. Rioja** • Dist. Pardo Miguel, Bosque de Protección Alto Mayo, on the way from El Afluente Pte to La Esperanza; 5°38'32.14–47.13"S, 77°41'00.41–44.6"W; 1370 m a.s.l.; 17 Jul. 2014; *Y.F. Deng et al. 1368*; USM • Aguas Verdes; [5°41′ S, 77°38′ W]; 20 Aug. 2002; *J. Campos & O. Diaz 8958*; USM • Vista Alegre near Moyobamba; [6°02′ S, 76°58′ W]; 1500 m a.s.l.; 16 Jun. 1947; *F. Woytkowski 35292*; MO [MO-1642837]. – **Pasco Region: Prov. Oxapampa** • Dist. Chontabamba, La Suiza Vieja, antigua carretera hacia Cerro de Pasco; 10°40′23″ S, 75°31′28.6″ W; 1935–2415 m a.s.l.; *S. Vilca C. & C. Rojas T. 512*; HOXA, MO [MO-2028316], USM • Gran Pajonal, vicinity of Chequitavo; 10°45′ S, 74°23′ W; 1200 m a.s.l.; 26 Sep. 1983; *D.N. Smith 5283*; MO [MO-1642824], US [US00672870], USM • Dist. Villa Rica, Laguna el Oconal, 10°45′07″ S, 75°16′11″ W; 1504 m a.s.l.; 10 Jun. 2008; *R. Rojas, L. Chuck, R. Rivera & C. Rojas 5744*; HOXA, USM. – **Madre de Dios Region: Prov. Tambopata** • Laguna Coco Cocha, 5.2 km E of Lodge; [12°49′ S, 69°16′ W]; 3 Jun. 1986; *V.A. Funk, B. Kahn & S. Wiser 8383*; K, USM • ca 30 air km or 70–80 river km SSW of Puerto Maldonado at the affluence río La Torre (río D'Orbigny)/río Tambopata, Tambopata Nature Reserve; 12°49′ S, 69°17′ W; ca 260 m a.s.l.; 21 Apr. 1980; *P.J. Barbour 4876*; MO [MO-1642800] • Dist. Las Piedras, río Amigos, Campamen to CICRA, trocha Mirador; 12°34′10.5″ S, 70°06′00.8″ W; 250 m a.s.l.; 14 Mar. 2003; *H. Beltrán 5277*; USM.

**Description**

Caulescent herb, to 150 cm high. *Stem* trailing at the base to erect, branching, rooting at the lower nodes; internodes to 18 cm long, to 7 mm thick, succulent, pale green to red, glabrous to sparsely villous. *Stipules* late deciduous, lanceolate, 3–12 × 2–4 mm, apex acuminate, translucent, light green to pale brown, glabrous, margin entire to lacerate, long-ciliate. *Leaves* > 5, alternate, basifixed; petiole 0.4–3.5 cm long, pale green to dark red, sparsely to densely villous; blade asymmetrical, transversely deltoid to ovate, to 6 × 3 cm, succulent, apex obtuse, base obliquely cordate, basal lobes not overlapping, sinus to 15 mm deep, margin crenate to dentate, ciliate, upper surface green to dark green, pilose, lower surface pale green, the veins sometimes red, sparsely pilose, densely villous on the major veins, veins palmate, 3–7 veined from the base. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 2 branches, bearing up to 2 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 2.5 cm long, red, densely villous, bracts persistent, ovate, 3–4 × 2–3 mm, translucent, brown, glabrous, apex truncate, margin lacerate, long-ciliate. *Staminate flowers*: pedicels to 8 mm long, densely villous; tepals

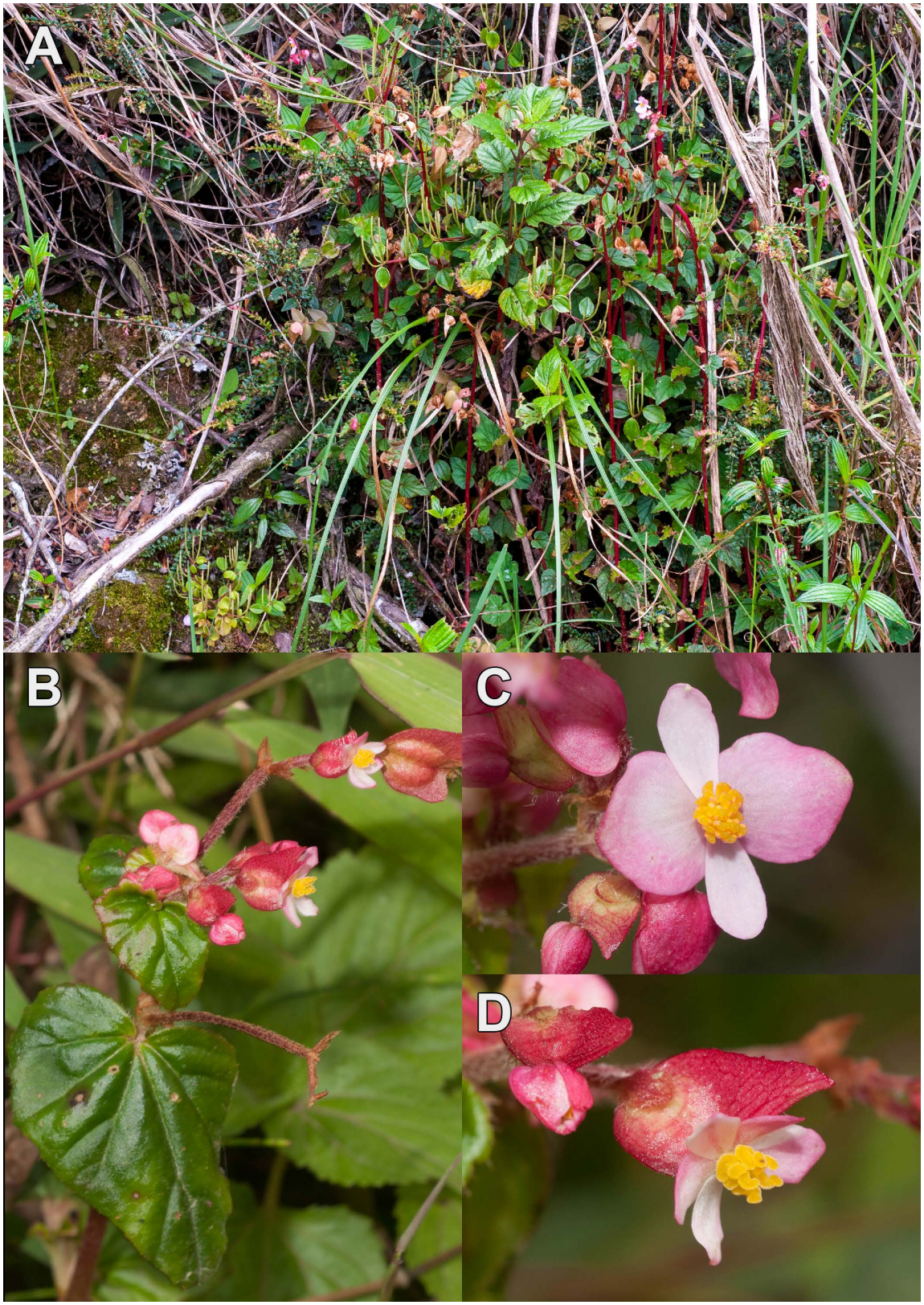


**Fig. 46.** *Begonia fischeri* Schrank. **A**. Habitat. **B**. Habit. **C**. Staminate flower. **D**. Pistillate flower. All photographs taken by P.W. Moonlight from *P.W. Moonlight & A. Daza 143* in Bongará Province, Amazonas Region and *74* in Cutervo Province, Cajamarca Region.

4, spreading, outer 2 ovate, 5–8 × 4–7 mm, apex rounded, white to pink, glabrous, margin entire, aciliate, inner 2 elliptic, 3–6 × 1.5–3 mm, apex rounded, white to pink, glabrous, margin entire, aciliate; stamens 12–20, projecting, yellow, filaments 0.5–1 mm long, free, anthers elliptic, 1–1.5 × 0.25 mm, dehiscing via lateral slits, connectives extending ca 0.1 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 12 mm long; bracteoles 2, positioned directly beneath the ovary, ovate, 3–4 × 2–3 mm, apex truncate, translucent, white to brown, glabrous, margin lacerate, ciliate; tepals 5, subequal, late deciduous in fruit, spreading, ovate, 4–7 × 1.5–3 mm, apex rounded, white to pink, glabrous, margin entire, aciliate; ovary body ovoid, 4–6 × 3–4 mm, white to pink, villous, unequally 3-winged, wings the largest triangular, ascending, largest 6–9 × 4–5 mm, smallest semi-circular, 5–8 × 2–3 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 1.5–2 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 20 mm long. *Fruit body* ovoid, to 14 × 12 mm, drying brown, wings same shape as in ovary, the largest expanding to 30 × 15 mm, the smallest to 14 × 8 mm.

**Proposed conservation assessment**

Widespread and common, both within and outside of Peru, and within disturbed areas. We assess *B. fischeri* as Least Concern (LC).

**Typification notes**

In 1820, Schrank published the name *B. fischeri*, citing plants growing in the warm house in Munich botanical gardens from Rio de Janeiro in Brazil (Schrank 1820: pl. 59). The protologue also included an illustration of these plants and stated that the same species had also been sent by C.F.P. von Martius. There is an excellent specimen collected by von Martius in Munich herbarium (M-0145727), which is a good match for Schrank's description and illustration. We therefore designate this as the lectotype of *B. fischeri*. There is also a part of a specimen collected by von Martius in New York herbarium with a label stating it is a "Fragm. ex hb. Acad. Monac" (NY00453926). This may have been part of the lectotype collection, and we assume it was in Munich in 1820, because New York herbarium was not established until 1895. We therefore tentatively treat this sheet as an isolectotype of *B. fischeri*.

The protologue of *B. patula* Fisch. ex Hornem. cites material introduced from 'horto Garenkano' (Hornemann 1819: 108). Jens Wilken Hornemann, who published the name, was primarily based in Copenhagen herbarium but examined additional material at other herbaria including BM, HBG, K, KIEL, LE, P, S, and W. It is possible that there is cultivated material seen by Hornemann in any one of these herbaria that could be designated as a lectotype. We refrain from designating a neotype of *B. patula* before a thorough search for original material has been carried out, with a specific focus on Copenhagen herbarium.

The protologue of *B. Pauciflora* Lindl. consists mainly of a letter written by Lindley describing a plant that flowered at the Colville Nursery in London (Lindley 1820: t. 471). No specimens are known that match Lindley's description, so we lectotypify this name based upon the excellent illustration in the protologue.

George Bentham described *B. palustris* A.Hartw. ex Benth. based upon the collection *A. Hartweg 1022* and cited no herbarium (Bentham 1845: 184). There are duplicates of this collection in at least seven European herbaria, but Bentham was based at Kew, so we chose a lectotype from there. We select the sheet K000536747 as the lectotype because it has more material than the alternative sheet and has the protologue citation written upon it in what may be Bentham's handwriting.

Klotzsch's description of *B. brasiliensis* Klotzsch included a reference to the collection *F. Sellow 2191* (Klotzsch 1855: 154). Jacques & Mamede (2005) stated incorrectly that there is a holotype in Berlin

herbarium, but as no herbarium was cited there is no holotype. There are two collections of this collection in Berlin herbarium. We choose B100242117 as the lectotype of *B. brasiliensis* because it includes illustrations by Klotzsch indicating he used it to describe this taxon and because there are photographs of it in various herbaria (F neg. 20895).

*Begonia elata* Klotzsch was described based upon material collected by Friedrich Sellow in Brazil and no herbarium was cited (Klotzsch 1855: 155) so it is appropriate to designate a lectotype. There are five duplicates of the collection *F. Sellow 135* in Berlin herbarium that all match this description and Jacques & Mamede (2005) designated a lectotype in Berlin herbarium. Unfortunately, they did not specify which of the five duplicates they intended to be the lectotype so only effected the first stage of lectotypification. We select the duplicate B100242122 as the lectotype because a photograph of this sheet is in several herbaria (F neg. 20894) so it has been treated as the de facto type since the 1940s.

Klotzsch cited the collection *C. Gaudichaud-Beaupré 1068* in the protologue of *B. macroptera* Klotzsch but cited no herbarium (Klotzsch 1855: 154). Jacques & Mamede (2005) cited the holotype of this name as a duplicate in Paris herbarium; however, as no herbarium was cited in the protologue, no holotype exists (McNeil 2014). Jacques & Mamede's citation does not count as an effective lectotypification, because since 1990 a lectotypification is only effective if the word "lectotypus" or a modern equivalent is used (Turland *et al.* 2018: Article 9.23). Klotzsch's home herbarium was Berlin and a duplicate in this herbarium includes illustrations demonstrating it was used by Klotzsch to describe *B. Macroptera* (B100242111). We designate this sheet the lectotype of *B. macroptera*.

*Begonia malvacea* Klotzsch was described based upon material collected by Friedrich Sellow in Brazil (Klotzsch 1855: 153). Jacques & Mamede (2005) were unable to lectotypify this name because they could not find any suitable material. There are numerous sheets of *B. fischeri* collected by Sellow in Brazil, but we have only found one that is determined by Klotzsch as *B. malvacea* (B101068567). We designate this as the lectotype of *B. malvacea*. We also note that there is a fragment of a photograph in Kew (F neg. 20897) that supposedly shows material of *B. malvacea* collected by Sellow in Berlin herbarium. This also shows *B. fischeri* but is not the same specimen as our lectotype. We have not been able to match it to any of the online material of *B. fischeri* in Berlin herbarium. This may be an isolectotype of *B. malvacea*.

Klotzsch published the name *B. moritziana* Klotzsch and cited material collected by Johann Wilhelm Karl Moritz in Colonia Tovar, near Caracas in Venezuela (Klotzsch 1855: 151). There are duplicates of the collection *J.W.K. Moritz 1705* in the herbaria of Berlin, the British Museum, and Kew that match Klotzsch's description. We designate the duplicate in Berlin as the lectotype of *B. moritziana* because it has illustrations drawn by Klotzsch, indicating he used this sheet when describing *B. moritziana*. We note Jacques & Mamede (2005) cited a duplicate of a collection "*Moritz s.n.*" in Berlin as the holotype of this name. We have not seen any unnumbered specimens collected by Moritz in Berlin and as no herbarium was cited in the protologue there is no holotype.

*Begonia parvifolia* Klotzsch, like many of the names published by Klotzsch, was described based upon material collected by Friedrich Sellow in Brazil (Klotzsch 1855: 153). A sheet in Berlin herbarium (B100242107) is labelled with his name in Klotzsch's handwriting. This sheet was also photographed as the type of *B. parvifolia* in the 1940s and the photograph distributed to several herbaria (F neg. 20900). We designate this the lectotype of *B. parvifolia*.

Klotzsch described *B. setosa* Klotzsch based upon material collected by Friedrich Sellow in Brazil (Klotzsch 1855: 151). There are several sheets of at least one collection made by Sellow and annotated by Klotzsch as *B. setosa*, including *F. Sellow s.n.* (B100247920), 4385 (B100247917, B100247918, B100247919). There are also sheets annotated as *B. setosa* in another hand, including *F. Sellow*

*s.n.* (B100249721, B101068569). We designate the unnumbered collection annotated by Klotzsch (B100247920) as the lectotype of *B. setosa*. Klotzsch typically cited collection numbers where available so we rule out all duplicates of *F. Sellow 4385*. We also rule out all specimens that do not have Klotzsch's handwriting.

The protologue of *B. vellerea* Klotzsch cites material collected in Serra de Estrella in Brazil by Friedrich Sellow (Klotzsch 1855: 152). No herbarium was cited but there is a specimen that matches this description in Berlin herbarium (B100243043). We designate this collection the lectotype.

The protologue of *B. ermaniii* Klotzsch cites material collected near Rio de Janeiro by Professor Erman (Klotzsch 1855: 155) and, as no herbarium is cited, there is no holotype. Jacques & Mamede (2005) incorrectly cited a holotype in Berlin herbarium but as this was after 1990, this was not an effective lectotypification (Turland *et al.* 2018: Article 9.23). We designate the sheet B100242115 as the lectotype of *B. ermaniii* and the later combinations of the basionym. This sheet was determined by Klotzsch as *B. ermaniii* and a photograph of the sheet is present in various herbaria (F neg. 20883), so it has previously been used as a de facto type.

Klotzsch described *B. uliginosa* Schott ex Klotzsch based upon material collected by H.W. Schott in Brazil (Klotzsch 1855: 155). There are two matching collections in Berlin herbarium: *H.W. Schott 927* (B100242118) and 928 (B100242119). We designate the former as the lectotype of *B. uliginosa* because it is the most complete collection and includes illustrations suggesting it was used by Klotzsch to describe the species.

Alphonse Pyramus de Candolle described *B. tovarensis* var. *ocanensis* A.DC. (de Candolle 1864: 303) based upon material of the collection *L. Schlim 100*. There is a specimen of this collection in the de Candolle's herbarium (G-DC) and we designate this the lectotype of this name. The specimen citation in the Prodromus says "in Linden" and it may be that de Candolle was attempting to cite a specimen "in h. Linden", which is his usual way of citing Brussels herbarium. If this were the case, any specimen of this collection would supersede our lectotype (Turland *et al.* 2018: Article 9.3). We have however been unable to locate any specimen matching this description in Brussels herbarium so assume this is not the case.

The protologue of *B. cilibracteola* C.DC. cited the collection *J.F. Cowell 388* but cited no herbarium (de Candolle 1919: 12) so all duplicates are syntypes. The author was based in Geneva herbarium, which includes a duplicate of this collection. This duplicate comprises a single leaf in a capsule, which is not suitable to function as a lectotype. We designate the syntype in the US National herbarium (US00115281) as the lectotype because it has a determination slip by Anne Casimir Pyramus de Candolle. The duplicate in the New York herbarium (NY00112266) is more complete, but we cannot confirm that de Candolle saw it.

**Synonymy notes**

We clarify here why *B. fischeri* is the correct name for this taxon. Four names have been applied to this taxon and were published in 1819 and 1820: *B. patula* Haw. (May 1819), *B. patula* Fisch. ex Hornem. (1819), *B. fischeri* (April to May 1920), and *B. pauciflora*. (July 1920). We have no evidence that *B. patula* Haw. refers to the same taxon as our concept of *B. fischeri* so exclude it from our concept (see Excluded names). *Begonia patula* Haw. may however invalidate *B. patula* Fisch. ex Hornem. as a later homonym. The exact date of publication of *B. patula* Fisch. ex Hornem. is unknown, but if it predates May 1918, it is the earliest correct name for our concept of *B. fischeri*. If it was published later, it is an illegitimate later homonym. For this reason, Jacques & Mamede (2005) suggested rejecting this name if

a type is found. The first name that applies to our concept and can be proven to be legitimate is therefore *B. fischeri*, which precedes the publication of *B. pauciflora* by two or three months.

In 1842, Gardner mistakenly identified one of his own collections (*G. Gardner 106*) as *B. villosa* Lindl., which is a synonym of *B. hirtella*. This collection in fact falls within our concept of *B. fischeri*. This has been recognised since 1861, when Alphonse Pyramus de Candolle cited "*Begonia villosa* Lindl." As a synonym of *B. hirtella* (de Candolle 1861: 345) and "*Begonia villosa* Gardn. … non Lindl." as a synonym of *B. macroptera* (de Candolle 1861: 346). Jacques & Mamede (2005) however cited "*Begonia villosa* Gardner" as an illegitimate later homonym of Lindley's name and discussed its typification. We clarify here that this is a misapplied name and not an illegitimate later homonym.

We newly synonymise *B. parvifolia* Klotzsch with *B. fischeri*. This species was synonymised with *B. patula* by Smith & Schubert (1950) and Irmscher (1953) suggested that *B. parvifolia* should be combined with *B. palustris* but did not formalise the change. Smith & Wasshausen (1984) transferred most of the synonyms of *B. fischeri* into its synonymy; however, we cannot find any evidence that *B. parvifolia* has been transferred into synonymy with *B. fischeri*. *Begonia parvifolia* falls within our concept of *B. fischeri* so we transfer it into synonymy herein.

In 1953, Edgar Irmscher attempted to publish new combinations for several *Begonia* species as varieties of *B. fischeri* (Irmscher 1953). These were *B. fischeri* var. *palustris* (A.Hartw. ex Benth.) Irmsch.; *B. fischeri* var. *brasiliensis* (Klotzsch) Irmsch.; *B. fischeri* var. *elata* (Klotzsch) Irmsch.; *B. fischeri* var. *ermanii* (Klotzsch) Irmsch.; *B. fischeri* var. *macroptera* (Klotzsch) Irmsch.; *B. fischeri* var. *malvacea* (Klotzsch) Irmsch.; *B. fischeri* var. *moritziana* (Klotzsch) Irmsch.; and *B. fischeri* var. *pohliana* (Klotzsch) A.DC. All these names are invalid because Irmscher only provided an indirect reference to the protologues of these names' respective basionyms (Turland *et al.* 2018: Articles 41.5, 41.8d).

**Identification notes**

*Begonia fischeri* is a common species in disturbed and wet, open habitats in lowland and montane Peru. It is the only annual species of *Begonia* in Peru with deltoid leaf blades. It is almost always in flower and fruit and the ascending, triangular ovary and fruit wings are very distinctive.

**Distribution and ecology**

Known from Cuba, Mexico, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Venezuela, Colombia, Ecuador, Peru, Bolivia, Argentina, and Brazil. Within Peru, collected in Loreto, Cajamarca, Amazonas, San Martín, Pasco, and Madre de Dios Regions (Fig. 45A). Found in Amazonia, northwest Peruvian relict montane forest, and lower and middle montane forest at an elevation of 90–2600 m a.s.l. *Begonia fischeri* is also rarely found in permanently wet localities in dry forests and scrubland, such as canyons, drainage ditches, and beneath waterfalls. *B. fischeri* is a fast-growing annual herb and unusually among *Begonia* species is frequently collected growing in full sunlight.

30. ***Begonia hirtella*** Link
Figs 45B, 47

*Enumeratio plantarum Horti regii botanici berolinensis altera* 2: 396 (Link 1822). – **Type**: COUNTRY UNKNOWN • *F. Sellow 2192*; neotype: B [B100243031], designated by Kollmann (2020: 92); isoneotypes: B [B100243032], B [B100243033].

Otto & Dietrich (1836: 359); Klotzsch (1855: 149); Walpers (1858: 879); de Candolle (1861: 344, 1864: 299); Schulz (1911: 28); Smith & Schubert (1941a: 192, 1946b: 72); Smith & Smith (1971: 48); Smith (1973: 215); Brako & Zarucchi (1993: 193).

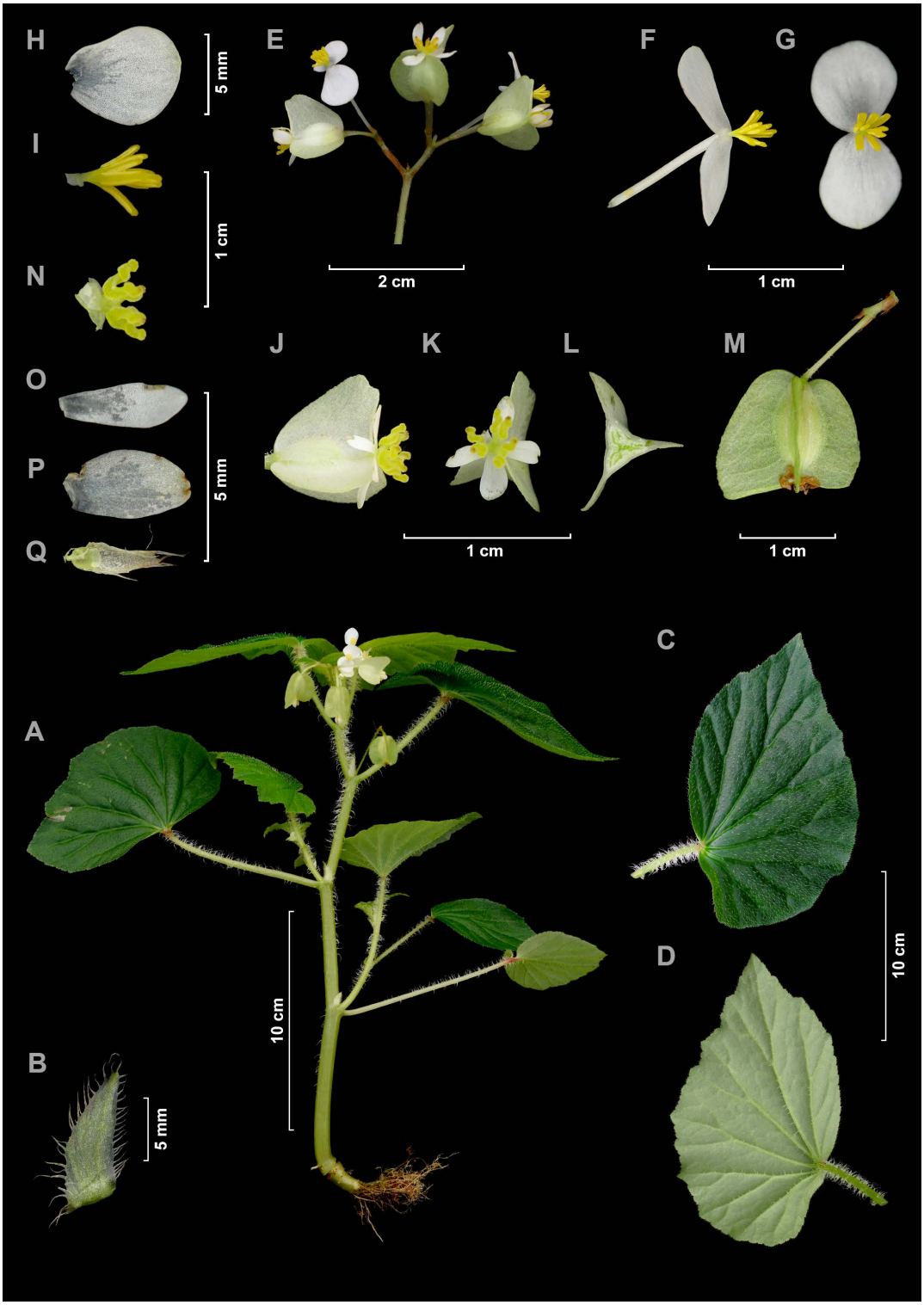


**Fig. 47.** *Begonia hirtella* Link. **A**. Habit. **B**. Stipule. **C**. Leaf, adaxial surface. **D**. Leaf, abaxial surface. **E**. Inflorescence. **F**. Staminate flower, side view. **G**. Staminate flower, front view. **H**. Tepal of staminate flower. **I**. Androecium, side view. **J**. Pistillate flower, side view. **K**. Pistillate flower, front view. **L**. Cross section of ovary. **M**. Developing fruit, side view. **N**. Pistils, side view. **O**. Smallest tepal of pistillate flower. **P**. Largest tepal of pistillate flower. **Q**. Bracteole. All photographs taken by D.A. Purvis from a glasshouse weed in the living collections of the Royal Botanic Garden Edinburgh.

*Begonia ciliata* Kunth in Humboldt *et al.* (1825), *Nova Genera et Species Plantarum (quarto ed.), vol. 7*: 178 (Humboldt *et al.* 1825). – **Type**: COLOMBIA • Guaduas, Santa Ana, 400 m a.s.l.; Apr., *F.W.H.A.v. Humboldt & A.J.A. Bonpland s.n.*; lectotype: P [P00679510], **designated here**.

Klotzsch (1855: 149); Walpers (1858: 879); de Candolle (1861: 345).

*Begonia villosa* Lindl., *The Botanical Register* 15: t. 1252 (Lindley 1829). – **Type**: lectotype: plate 1252 in Lindl., *The Botanical Register* 15: t. 1252 (Lindley 1829), **designated here**.

Klotzsch (1855: 149); Walpers (1858: 879); de Candolle (1861: 345); Otto & Dietrich (1836: 359).

*Begonia brasila* A.DC., *Mémoires de la Société de Physique et d'Histoire Naturelle de Genève* 7: 295 (de Candolle 1836). – **Type**: BRAZIL • *P.W. Lund 382*; neotype: G-DC, **designated here**.

de Candolle (1861: 343).

*Begonia albido-setulosa* Hassk., *Hortus Bogoriensis Descriptus*: 313 (Hasskarl 1858). – **Type**: BRAZIL • *F. Sellow 2192*; neotype: B [B100243031], **designated here**; isoneotypes: B [B100243032], B [B100243033].

de Candolle (1864: 298); Doorenbos *et al.* (1998: 227).

*Begonia brasiliana* Schrank ex Steud. (nom. inval.; nom. nud.), *Nomenclator Botanicus (Steudel), 2nd Edition, vol. 1*: 193 (von Steudel 1840).

*Begonia dasypoda* Meisn. ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia hirtella* Link), *Flora Brasiliensis* 4 (1): 345 (de Candolle 1861).

*Begonia ciliata* var. *nana* Pav. ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia hirtella* var. *nana* (Walp.) A.DC.), *Flora Brasiliensis* 4 (1): 345 (de Candolle 1861).

*Begonia villosa* var. *nana* Klotzsch ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia hirtella* var. *nana* (Walp.) A.DC.), *Flora Brasiliensis* 4 (1): 345 (de Candolle 1861).

*Begonia hirtella* var. *nana* (Walp.) A.DC. pro parte in A.DC. *Flora Brasiliensis* 4 (1): 345 (de Candolle 1861); *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 299 (de Candolle 1864).

### Etymology

The epithet is derived from the diminutive form of the Latin word '*hirtus*' meaning 'hairy' and refers to the small hairs of the species.

### Selected specimens examined

PERU – **San Martín Region: Prov. San Martín** • Dist. Tarapoto, Prope Tarapoto; [6°27′ S, 76°20′ W]; Jun. 1855; *R.E. Spruce 3982*; BM, E [E00299530], G-DC, K [K000006029], NY, TCD • ibid.; *R.E. Spruce 3982aa*; OXF • Proyecto Takiwasi; [6°27′ S, 76°20′ W]; 700 m a.s.l.; 29 Mar. 1991; *J. Ruiz & J. Campos 1726*; K, MO [MO-1642498], NY, US [US00672841] • Route from Tarapoto to Yurimaguas; 6°27′52″ S, 76°18′37″ W; 787 m a.s.l.; 3 Feb. 2016; *P.W. Moonlight & A. Daza 166*; E [E00885891], MO, MOL. – **Prov. Lamas** • Dist. Lamas, north of San Antonio 2–4 km, along río Cumbasa; [6°23′ S, 76°24′ W]; ca 365 m a.s.l.; 2–4 Nov. 1937; *C.M. Belshaw 3525*; K, MO [MO-1642502], NY [NY00453964], U, US [US00222154].

### Description

Caulescent herb, to 40 cm high. *Stem* erect, branching; internodes to 11 cm long, to 3 mm thick, succulent, pale green, villous. *Stipules* persistent, lanceolate, 4–8 × 2–3 mm, apex acute, translucent, white, glabrous, margin entire, long-ciliate. *Leaves* > 3, alternate, basifixed; petiole 0.8–7 cm long, white to pale green, villous; blade asymmetric, ovate, to 9 × 5 cm, succulent, apex obtuse to acuminate, base obliquely truncate to obliquely cordate, basal lobes not overlapping, sinus to 5 mm deep, margin entire to crenate or dentate, sometimes with 1–3 short, triangular lobes along the broadest side of the lamina, ciliate, upper surface green, sparsely villous, lower surface pale green, sparsely villous, veins palmate but with 1 primary vein, 6–8 veined from the base, with 1–3 secondary veins on the larger side, 1–2 on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 2 branches,

bearing up to 4 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 2.5 cm long, white to pale green, villous, bracts persistent, lanceolate, 1.5–3 × 1 mm, translucent, white, glabrous, apex acute, margin entire, long-ciliate. *Staminate flowers*: pedicels to 4 mm long, glabrous to sparsely villous; tepals 2, spreading, circular, 2–3 × 2–3 mm, apex rounded, white, glabrous, margin entire, aciliate; stamens 8–10, projecting, yellow, filaments ca 0.5 mm long, free, anthers linear, 0.5–1 × 0.2 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 4 mm long; bracteoles 2, directly beneath the ovary, lanceolate, ca 1.5 × 1 mm, translucent, white, glabrous, apex acute, margin entire, ciliate; tepals 5, subequal, persistent in fruit, spreading, oblanceolate, 1–2 × 0.5–1 mm, apex obtuse to rounded, white, glabrous, margin entire, aciliate; ovary body ovoid, ca 3 × 1 mm, white, glabrous, unequally 3-winged, wings triangular, largest ca 5 × 3 mm, smallest ca 5 × 1 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 1.5 mm long, once-divided, stigmatic papillae n a spirally twisted band. *Fruiting pedicel* to 15 mm long. *Fruit body* ovoid, to 9 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding to 13 × 10 mm, the smallest expanding to 12 × 6 mm.

**Proposed conservation assessment**

Known from a small area within Peru but widespread and often common across the Caribbean and in the Brazilian Mata Atlântica and known from Colombia and Venezuela. *Begonia hirtella* has been widely introduced elsewhere and is often found in highly disturbed environments, including in roadside gutters. We assess *B. hirtella* as Least Concern (LC).

**Typification notes**

The protologue of *B. ciliata* Kunth cites material collected "prope Santannam" in New Granada, modern day Colombia (Humboldt *et al.* 1825: 178). Kunth was working on material collected by Humboldt and Bonpland, and there is a sheet of *F.W.H.A.v. Humboldt & A.J.A. Bonpland s.n.* in Paris herbarium collected in 'Sa Anna' (P00679510), which we interpret as Santa Ana. Confusingly this specimen has a second label saying "Guaduas", which is almost 1000 km south of Santa Ana. There is only one plant on the sheet so this cannot be a mixed collection. The first label has a full citation of the protologue written by Kunth, indicating he used this collection to describe *B. ciliata*. Accordingly, we designate this specimen as the lectotype of *B. ciliata* herein.

*Begonia villosa* Lindl. was described based upon a plant presented to the Royal Horticultural Society by the Sheriff of Cornwall, Sir Charles Lemon, who had raised it from seeds collected in Brazil (Lindley 1829: t. 1252). The author did not cite any herbarium material and it is unlikely any exists. We lectotypify this name based upon the excellent plate in the protologue.

The protologue of *B. brasila* A.DC. cites material sent from Prague Botanic Garden to Geneva (de Candolle 1836: 295). We presume that this was living material, because we have been unable to locate any herbarium material in de Candolle's herbarium that indicates it was sent from Prague. Alphonse Pyramus de Candolle (1861: 343) later synonymised *B. brasila* with *B. hirtella* and did not cite any specimens grown either in Prague or Geneva as *B. hirtella*. We therefore designate a neotype for *B. brasila* and chose the specimen *P.W. Lund 382* in G-DC. This specimen was cited by de Candolle as *B. hirtella* (de Candolle 1861: 344, 1864: 299) while including *B. brasila* in synonymy, so he clearly considered it the same taxon.

*Begonia albido-setulosa* Hassk. was described based upon material cultivated in Bogor botanic garden (Hasskarl 1858: 313). We have not been able to visit Bogor herbarium but photographs of all *Begonia* specimens in the herbarium are hosted on the *Begonia* Resource Centre (Hughes *et al.* 2015–ongoing). There are no cultivated specimens dating from before the protologue or matching Hasskarl's description, so it is highly likely that no original material exists. We do not know of any specimens of *B. hirtella*

cultivated in Asia so neotypify this name based upon the neotype of *B. hirtella*, *F. Sellow 2192* (B [B100243031]).

### Synonymy notes

*Begonia ciliata* var. *nana* Klotzsch and *B. villosa* var. *nana* Klotzsch were both cited by Alphonse Pyramus de Candolle as synonyms of his *B. hirtella* var. *nana* (Walp.) A.DC. based upon annotations by Klotzsch in Berlin herbarium (de Candolle 1861: 345). As such, they are both rejected names. We cite them in the synonymy of *B. hirtella* because all specimens annotated by Klotzsch as either name are this species. *Begonia hirtella* var. *nana* sensu de Candolle (1861, 1864) is a pro parte synonym of *B. hirtella* because most of the specimens cited by de Candolle are this species.

### Identification notes

*Begonia hirtella* is most similar to *B. humilis*. Both species are diminutive, annual herbs that flower throughout the year and can be distinguished from *B. semiovata* by the ciliate margins to their stipules. They are difficult to distinguish from one another, but can be determined most readily by their placentation, which is entire in *B. humilis* and divided in *B. hirtella*, but also by several vegetative characters. The leaf lower surface of *B. humilis* is glabrous in Peruvian material (vs sparsely villous) and the primary vein is much more distinct (vs equally prominent to the other major veins). Finally, the leaves in *B. hirtella* are usually more than half as wide as long, whereas in *B. hirtella* they are usually less than half as wide as long.

### Distribution and ecology

Native to Jamaica, Guadeloupe, Martinique, Venezuela, Colombia, Peru, and Brazil. It has also been introduced outside the tropical Americas, including in India, Taiwan, and Hawaii (Chao 2019). Within Peru, collected in San Martín Region (Fig. 45B), and known from Amazonian and lower montane forest at an elevation of ca 300–700 m a.s.l. *Begonia hirtella* is an annual species and, unusually for *Begonia* species, can be found growing in full sun.

## ***Begonia*** sect. ***Eupetalum*** (Lindl.) A.DC.

*Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 280 (de Candolle 1864). – *Eupetalum* Lindl., *A natural system of botany, 2nd ed.*: 440 (Lindley 1836). – **Type**: holotype: *Eupetalum petalodes* Lindl. = *Begonia geraniifolia* Hook.

### Synonymy notes

For a full list of sectional synonyms, see Moonlight *et al.* (2018).

### Notes

Most geophytic Peruvian begonias are members of this section, which is distributed from Argentina to Colombia. The circumscription of *B.* sect. *Eupetalum* was significantly reduced by Moonlight *et al.* (2018) to include mostly acaulescent species with multifid styles and an unusually high number of tepals on both the staminate and pistillate flowers. Their circumscription also included three species that are either caulescent (*B. geranifolia* and *B. neoharlingii*), have bifid styles (*B. weberbaueri*), or only have four and five tepals on their staminate and pistillate flowers, respectively (all three species). Moonlight *et al.* (2020) added a fourth misfit to the section, *B. joshii*, which also has bifid styles.

The current circumscription of *B.* sect. *Eupetalum* includes fifteen species, of which ten are found in Peru and six are endemic. Our account includes an expanded circumscription of *B. neoharlingii*, which is newly recorded from Peru.

31. ***Begonia geraniifolia*** Hook.
Figs 48A, 49

*Curtis's Botanical Magazine* 62: t. 3387 (Hooker 1835). – *Eupetalum geraniifolium* (Hook.) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 121 (Klotzsch 1854). – **Type**: PERU – **[Lima Region: Prov. Lima]** • Amancaes; [11°50′ S, 77°01′ W]; *A. Matthews 134*; holotype: K [K000252038].

Klotzsch (1855: 141); Walpers (1858: 875); de Candolle (1864: 281); Smith & Schubert (1941a: 188); Brako & Zarucchi (1993: 192).

*Begonia petalodes* Lindl., *The Botanical Register* 21: t. 1757 (Lindley 1835). – *Eupetalum petalodes* (Lindl.) Lindl., *A natural system of botany, 2nd ed.*: 440 (Lindley 1836). – **Type**: lectotype: t. 1757 in Lindl., *The Botanical Register* 21: t. 1757 (Lindley 1835), **designated here**.

Klotzsch (1855: 140); Walpers (1858: 875); de Candolle (1864: 281); Smith & Schubert (1941a: 189).

*Eupetalum lindleyanum* Gaudich., *Voyage Autour du Monde, Exécuté Pendant les Années 1836 et 1837 sur la Corvette La Bonite, vol. 3(Atlas)*: pl. 50 (Gaudichaud-Beaupré 1842). – *Begonia gaudichaudii* Walp. (nom. illeg.; nom. superfl.), *Repertorium Botanices Systematicae* 5: 768 (Walpers 1846). – **Type**: PERU – **Lima Region: Prov. Callao** • San Lorenzo; [12°05′ S, 77°13′ W]; Jul. 1836; *C. Gaudichaud-Beaupré s.n.*; lectotype: G, **designated here**; isolectotypes: G, G-DC [2: F neg. 7328], K [2], MO [2: MO-2264392, MO-2264405], P [3: P05586571, P05586572, P05586573], RB [RB00053825], US [2: US00222150, US00222151].

Walpers (1858: 875); Gaudichaud-Beaupré (1866: 18); de Candolle (1864: 281); Smith & Schubert (1941a: 189).

*Eupetalum kunthianum* Klotzsch, *Gattungen und Arten* 1854: 141 (Klotzsch 1855). – **Type**: PERU – **Lima Region: Prov. Callao** • San Lorenzo; [12°05′ S, 77°13′ W]; Jul. 1836; *C. Gaudichaud-Beaupré s.n.*; lectotype: G, **designated here**; isolectotypes: G, G-DC [2: F neg. 7328], K [2], MO [2: MO-2264392, MO-2264405], P [3: P05586571, P05586572, P05586573], RB [RB00053825], US [2: US00222150, US00222151].

Walpers (1858: 875); de Candolle (1864: 281); Smith & Schubert (1941a: 189).

*Eupetalum tuberosum* Klotzsch, *Gattungen und Arten* 1854: 142 (Klotzsch 1855). – **Type**: PERU – **[Lima Region]** • ad Amancaes; [11°50′ S, 77°01′ W]; *H. Ruiz & J.A. Pavón s.n.*; lectotype: B [B100243038, F neg. 20862], **designated here**.

Walpers (1858: 875); de Candolle (1864: 281).

*Begonia tuberosa* Ruiz ex Klotzsch (nom. inval.; nom. rej. pro syn. *Eupetalum tuberosum* Klotzsch (nom. inval.; nom. nud.)), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 121 (Klotzsch 1854).

*Eupetalum gaudichaudii* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 121 (Klotzsch 1854).

*Eupetalum kunthianum* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 121 (Klotzsch 1854).

*Eupetalum tuberosum* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 121 (Klotzsch 1854).

*Eupetalum lindleyanum* herb. ex Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 141 (Klotzsch 1854).

### Etymology

Named for the superficial resemblance of the species' leaves to those of geraniums and cranesbills (*Geranium* L., Geraniaceae).

### Selected specimens examined

PERU – **Cajamarca Region: Prov. Contumazá** • Arriba del Rupe, siguiendo la carretera Chilete-Contumaza; [7°17′ S, 78°49′ W]; 1500 m a.s.l.; 10 Mar. 1986; *I. Sánchez Vega 4009*; CPUN • Road between Cascas and Contumazá, 7°23′34″ S, 78°47′47″ W; 2892 m a.s.l.; 23 May 2015; *M.C. Tebbitt & A. Daza 830*; E, MOL • Yetón; [7°23′ S, 78°48′ W]; 1840 m a.s.l.; 22 Jan. 1972; *A.M. Lopez & A. Sagástegui 7897*; HUT. – **La Libertad Region: Prov. Trujillo** • Cerro Prieto; [7°55′ S, 78°48′ W]; 675 m a.s.l.; 14 Jul. 1949; *N. Angulo 1017*; F [V0078822F], HUT • Cerro Campana; [8°07′ S, 79°05′ W]; 600 m a.s.l.; 10 Aug. 1985; *J. Mostacero L., L. Leiva G., F. Mejía C., F. Peláez P. 1076*; HUT, MO [MO-1642688], NY [2: NY01085843, NY01085844] • Cerro Chuputur; [8°11′ S, 78°56′ W]; 400–500 m a.s.l.; 25 Jul. 1948; *N. Angulo & A. López 0830*; HUT. – **Ancash Region: Prov. Santa** • Lomas de Lupín, entre Barranca y Huarmey; [10°21′ S, 77°56′ W]; 400–500 m a.s.l.; 29 Jul. 1959; *R. Ferreyra 13791*; MO [MO-1642691], USM. – **Lima Region: Prov. Chancay** • Lomas de Lachay; 11°20′ S, 77°30′ W; 400 m a.s.l.; 1 Sep. 1991; *A.H. Gentry, C. Díaz, R. Ortiz & C. de Maestria 74500*; MO [MO-1643519] • ibid.; [11°22′ S, 77°21′ W]; 300–500 m a.s.l.; 1 May 1996; *A. Cano & Y. Roque 7584*; USM. – **Prov. Huaral** • On the Pan American Highway, km 78 N of Lima, 2 km east of the km stone, Lomas de San Juan San Cayetano de Chancayllo; [11°28′ S, 77°18′ W]; ca 100 m a.s.l.; 27 Aug. 1964; *P.C. Hutchinson 6301*; F [V0078820F], K, MO [MO-2180399], NY, US [US00222135], USM. – **Prov. Lima** • Lomas de Carabayllo entre los cerros San Diego y Parades; [11°47′ S, 77°04′ W]; 8 Jul. 2000; *J. Roque, A. Cano, C. Cáceres & A. Ramirez 1626*; USM • in monte Amancaes prope Lima; [11°50′ S, 77°01′ W]; 21 Jul. 1876; *E. André 4088*; F [V0078819F], K, NY • Quebrada de Manzano, trail to Cerro Menzano, E of Pachacamac; 12°15′ S, 76°55′ W; 300–600 m a.s.l.; 14 Sep. 1986; *S. Knapp 8328*; MO

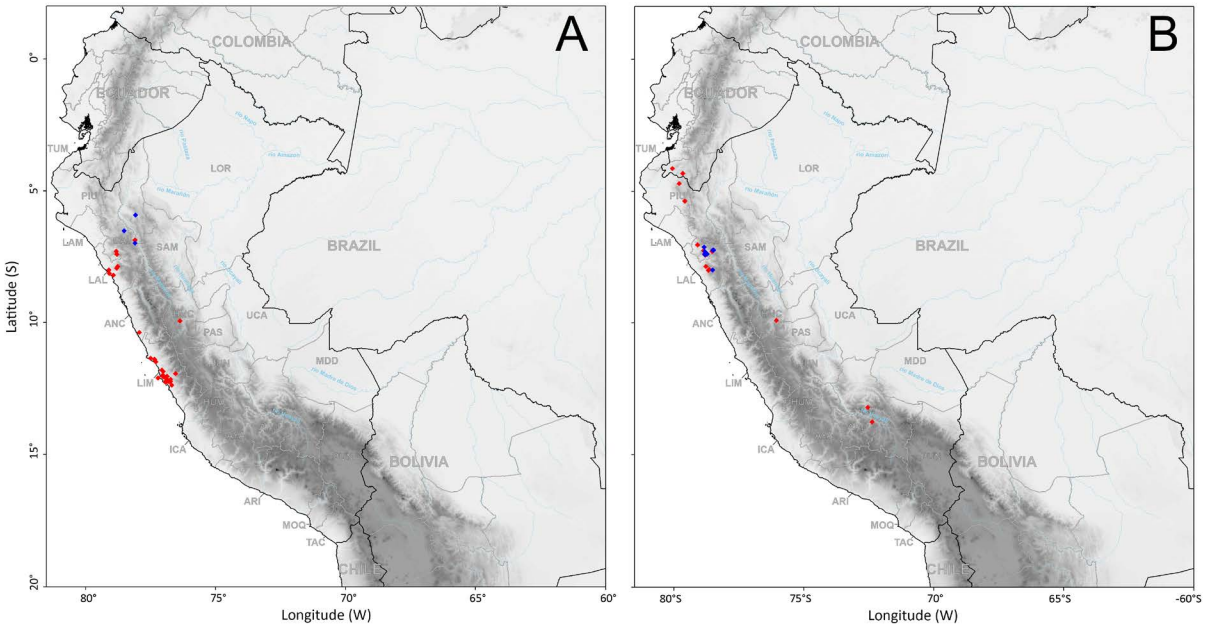


**Fig. 48.** Distribution of *Begonia* sect. *Eupetalum* (Lindl.) A.DC. in Peru and surrounding countries. **A**. *B. geraniifolia* Hook. (red) and *B. joshii* Moonlight (blue). **B**. *B. neoharlingii* L.B.Sm. & Wassh. (red) and *B. weberbaueri* Irmsch. (blue). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.


**Fig. 49.** *Begonia geraniifolia* Hook. Reproduction of the type illustration of *Begonia petalodes* Lindl. by Miss Sarah Ann Drake from Lindley (1835: t. 1757) from the copy at the Royal Botanic Garden Edinburgh.

[MO-1642692]. – **Prov. Huarochiri** • Lomas El Manzano, Cucuya, Pachacamac; [12°12′ S, 79°50′ W]; 16 Jul. 1994; *S. Llatas Q. 3508*; HUT, UMS • San Bartolomia; [11°55′ S, 76°32′ W]; Jul. 1876; *P.A. Savatier 1396*; K.

**Description**

Caulescent, rhizomatous herb, to 35 cm high. Rhizome ellipsoid, 2–5 × 2–4 cm, with 1–3 growing points. *Stem* erect, rarely branching; internodes to 15 cm long, to 10 mm thick, succulent, red, glabrous. *Stipules* persistent, broadly ovate, 6–10 × 4–12 mm, apex obtuse, opaque, red, glabrous, margin irregularly-dentate, aciliate. *Leaves* 4–6, alternate, basifixed; petiole 1–4 cm long, pale green to red, glabrous; blade subsymmetric, ovate, to 6 × 9.5 cm, succulent, apex indistinct, base truncate to cordate, basal lobes not overlapping, sinus to 10 mm deep, margin serrate, with up to 5 irregular, triangular lobes, aciliate, upper surface green, glabrous, lower surface pale green flushed red, glabrous, veins palmate, 6–8 veined from the base. *Inflorescences* 1–4 per stem, bisexual, axillary, erect, cymose, with 6 branches, bearing up to 4 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 15 cm long, red, glabrous, bracts late-deciduous, elliptic to ovate, 2–8 × 1–4 mm, opaque, white to red, glabrous, apex acute, margin entire to serrate, aciliate. *Staminate flowers*: pedicels to 2 mm long, glabrous; tepals 4, spreading, outer 2 ovate to ovate, 8–10 × 6–9 mm, apex acute to obtuse, white to pink, glabrous, margin entire, aciliate, inner 2 obovate, 6–8 × 5–12 mm, apex truncate, often with two rounded apical lobes, pink, glabrous, margin entire, aciliate; stamens ca 20, spreading, yellow, filaments 1–2 mm long, free, anthers obovoid, 1–1.5 × 0.8 mm long, dehiscing via lateral slits, connectives extending to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 20 mm long; bracteoles lacking; tepals 5 or rarely 6, subequal, deciduous in fruit, spreading, the largest ovate, 4–9 × 3–5 mm, apex truncate, white to pink, glabrous, margin entire, aciliate, the smallest elliptic, 3–7 × 2–4 mm, apex acute, white to pink, glabrous, margin entire, aciliate; ovary body ovoid, 2.5–3 × 3–4 mm, green to red, glabrous, sub-equally 3-winged, wings narrow-triangular, 2–3 × 5–10 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2–4 mm long, 4–6 times divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 55 mm long. *Fruit body* obovoid, to 6 × 8 mm, drying brown, wings same shape as in ovary, expanding to 7 × 35 mm.

**Proposed conservation assessment**

Common in the Lomas surrounding Lima and Trujillo and likely also in less well collected Lomas between. It seems scarcer in its Andean range, but this probably reflects collecting biases; few botanists collect in the Andes during the wet season. The species' EOO is > 30 000 km$^2$ and, while there has been some urban encroachment onto Lomas formations near Lima, we know of no specific threats to this species. We assess *B. geraniifolia* as Least Concern (LC).

**Notes**

To assess the sectional relationships of *B. joshii*, Moonlight *et al.* (2020) included a phylogenetic tree with two accessions labelled as *B. geraniifolia*. The resultant tree resolved *B. geraniifolia* as paraphyletic with *B. joshii* nested within, and with significant genetic difference between the two accessions of *B. geraniifolia*. They therefore recommended future authors give particular attention to the circumscription of this species. We now recognise many of the specimens previously recognised as *B. geraniifolia* as *B. neoharlingii* L.B.Sm. & Wassh., including the accession "*B. geraniifolia* 1" in Moonlight *et al.* (2020: *P.W. Moonlight & A. Daza 116*).

Our new circumscription of *B. geraniifolia* and *B. neoharlingii* are mostly geographically and environmentally distinct as well as morphologically distinct (see Identification notes). *Begonia geraniifolia* is mostly a species of coastal Lomas hills from La Libertad to Lima Regions at elevations < 500 m. In the north of its range, in Cajamarca and La Libertad Regions, it has infrequently been

collected on the western slopes of the Andes at elevations up to 1840 m a.s.l. in valleys that trap fog in the wet season. In contrast, *B. neoharlingii* has been exclusively collected in the Andes at elevations above 1750 m a.s.l. and usually from 2000–3500 m a.s.l. Its habitat includes relict northwest Peruvian montane forest and areas of montane forest on the eastern slope of the Andes, but also includes areas that trap fog on the western slopes of the Andes.

The specimen *É.F. André 2376* (K) is *B. geraniifolia* but the specimen label says it was collected in Cauca, Colombia. We consider it extremely unlikely that this species occurs in Colombia and suggest this is likely an incorrect label.

Sheets of *B. geraniifolia* collected by Ruiz and Pavón housed in B (B100243038, F neg. 20862, the lectotype of *E. tuberosum* Klotzsch. ex Klotzsch), G-BOIS, and MA (MA813499) are labelled as "*Begonia tuberosa*". The same name is used as part of a detailed description on the label of a sheet from Dombey's herbarium now housed in P (P00679108). The annotations on the label of the sheet in MA suggest Ruíz, Pavón, and Dombey believed this was possibly *B. tuberosa* Lam. (or *B. capensis* L.f.). This is a rare case where the name used by Ruiz and Pavón matches the name on an illustration housed in Madrid (MA-AJB04-D-1389) by Isidro Gálvez, demonstrating a clear and unambiguous link between specimens and the illustration.

**Typification notes**

*Begonia geraniifolia* was described by W.J. Hooker in 1835 (Hooker 1835), who cited material received from Mr Matthews and living plants grown in Glasgow and collected by Mr McLean in 1833. In 1835, Hooker was the director of Glasgow Botanic Gardens, and was appointed as director of the Royal Botanic Gardens Kew in 1841. He took much of his herbarium collection to London, which formed the basis of the original Kew herbarium (K). Specimens remaining in Glasgow were incorporated into the herbarium of the Royal Botanic Garden Edinburgh (E) in 1965. We have been unable to locate any material collected from McLean's material in either Edinburgh or Kew and even if we did, we would not consider this syntype material as the protologue referred to living rather than herbarium material. There is a single sheet containing material of *B. geraniifolia* collected by Matthews in the herbarium at Kew (*Matthews 134* [K000252038]). This sheet includes five full plants of *B. geraniifolia* and two labels: the Matthews label and a label for plants collected by Mr W. Nation in 1862, after the description of *B. geraniifolia*. It is not absolutely clear which plants were collected by Nation and which by Matthews, so there is an argument for treating the Matthews material as lost and designating the only remaining original material (the illustration in the protologue) as a lectotype. We however believe the plant mounted closest to the Matthews label was almost certainly collected by Matthews. We therefore treat this specimen as the holotype of *B. geraniifolia* and the homotypic name *Eupetalum geraniifolium* (Hook.) Klotzsch.

J. Lindley described *B. petalodes* Lindl. based upon material sent to him by Mr Richard Harrison in April 1833 (Lindley 1835). He presumed the species was from Brazil, but the illustration provided within (Fig. 49) clearly shows *B. geraniifolia*. A peculiarity of this plate is the unclear number of tepals on the pistillate flowers. *Begonia geraniifolia* always has five tepals on the pistillate flowers, but Lindley remarked in the protologue "two or four being the number of floral envelopes". We believe the artist saw five tepals but, to make five tepals look like either two or four, drew an indistinct number of flowers. In all other respects, the plate clearly shows *B. geraniifolia*. The protologue of this species did not cite any herbarium material and we have been unable to locate any sheets that could reasonably be considered as original material. We therefore designate the plate in the protologue as the lectotype of *B. petalodes*.

The first appearance of the name *E. lindleyanum* Gaudich. in the literature is in an 1842 article by C. Gaudichaud-Beaupré, where it is accompanied by an illustration that includes several important characters

for identification (Gaudichaud-Beaupré 1842: pl. 50). This name is validly published because, prior to the 1st of January 1908, an illustration with analysis was acceptable in the place of a written description or diagnosis (Turland *et al.* 2018: Article 38.7) and figures separate from the main illustration of the organism showing details aiding identification constitutes analysis (Turland *et al.* 2018: Article 38.9). In 1866, Gaudichaud published text to accompany his 1842 publication, but for *E. lindleyanum*, this only included a caption for the plate (Gaudichaud-Beaupré 1866: 18). A collection made by Gaudichaud in 1836 is deposited in various European herbarium, of which there are two duplicates in the main herbarium in Geneva (G). One of these is labelled as *"Eupetalum lindleyanum*". We designate this as the lectotype of the name. In 1846, Walpers transferred Gaudichaud's *E. lindleyanum* into the genus *Begonia* as *B. gaudichaudii* Walp. (Walpers 1846: 768). This is in contravention of the nomenclatural code as Walpers cited *Eupetalum lindleyanum* in synonymy when the name *B. lindleyanum* should have been adopted (Turland *et al.* 2018: Article 51.1). Walpers' *B. gaudichaudii* is therefore an illegitimate superfluous name.

The protologue of *E. kunthianum* cites material collected material collected in San Lorenzo and Lima and held in "herb. Kunthii" that is labelled as "*Eupetalum lindleyanum*" (Klotzsch 1855: 141). Kunth's herbarium no longer exists, and its specimens have been distributed to various herbaria. The locality description matches a collection made by Gaudichaud on the voyage of the Bonite in July 1836. The only duplicate of this collection that is labelled as "*Eupetalum lindleyanum*" is the same sheet held in G that we designate as the lectotype of *E. lindleyanum*. We therefore designate this specimen as the lectotype of *E. kunthianum*.

In the protologue of *E. tuberosum*, Klotzsch cited material collected in Lima and San Juan by Ruiz and Pavón (Klotzsch 1855: 142). There are no known herbarium sheets that match the description. Instead, it seems likely that Klotzsch misinterpreted the labels of material collected by Ruiz and Pavón in June 1776 in Lomas de Amancaes near Lima. These collections are labelled as "Flor de San Juan", which is the local name for *B. geraniifolia* (Steele 1964: 80). It seems Klotzsch misinterpreted "Flor de San Juan" name as a locality. Material collected in Amancaes by Ruiz and Pavón is present in B, G, and G-BOIS but only the sheet in B (B100243038, F neg. 20862) has Klotzsch's handwriting upon it, so we designate it as the lectotype of *E. tuberosum*. We do not consider the sheets in G and G-BOIS as isolectotypes because Ruiz and Pavón did not use collection numbers, so it is impossible to know whether these collections were made on the same day or at the same locality.

**Identification notes**

*Begonia geraniifolia* and *B. neoharlingii* are superficially similar to members of *B.* sect. *Australes*, which are also geophytic, caulescent herbs. They differ in their multifid rather than bifid styles. The two species are relatively simple to distinguish when flowering. *Begonia neoharlingii* has a pair of bracteoles directly beneath the ovary on the pistillate flower, whereas *B. geraniifolia* lacks bracteoles. The inner tepals of the staminate flowers of *B. neoharlingii* are rounded at the apex, while those of *B. neoharlingii* have two rounded lobes at the apex, and the staminate tepals of *B. neoharlingii* are much larger (8–30 × 9–12 mm vs 6–10 × 9 mm). When sterile, *B. neoharlingii* can be distinguished as a generally larger plant with leaves with a crenate or rarely dentate margin (vs serrate) and only rarely with lobed leaves (vs usually with 3–5 triangular lobes).

**Distribution and ecology**

Endemic to Peru and known from Cajamarca, La Libertad, Ancash, and Lima Regions (Fig. 48A). Found in coastal Lomas formations at an elevation of 0–500 m a.s.l. and in dry forest and scrubland at elevations up to 1500 m a.s.l. *Begonia geraniifolia* is a geophytic species and dies back to its rootstock in the dry season. In the coastal Lomas, the wet season is from July to November and in the Andean Dry Shrublands it is usually March to May.

32. ***Begonia joshii*** Moonlight
Figs 1B, 2G, 7D, 48A, 50

*Edinburgh Journal of Botany* 77 (1): 149 (Moonlight *et al.* 2020). – **Type**: PERU • Cultivated collection; 29 Nov. 2019; *P.W. Moonlight 1277*; holotype: USM; isotype: E [E00884943]; cultivated at the Royal Botanic Garden Edinburgh from seed collected in the wild (accession no 20180923: Amazonas Region: Prov. Chachapoyas: trail over Puente La Florida from km 278 of Pedro Ruiz Gallo-Bagua Grande road, ca 4 km from trail head, 5°54′13″ S, 78°4′33″ W, 2064 m a.s.l.; 3 Jul. 2018; *P.W. Moonlight 1253*).

**Etymology**

Named for Josh Allen, who sent photographs of the species to the author.

**Specimens examined**

PERU – **Amazonas Region: Prov. Chachapoyas** • trail over Puente La Florida from km 278 of Pedro Ruiz Gallo–Bagua Grande road, ca 4 km from trail head; 5°54′ 17”S, 78°4′42”W; 1441 m a.s.l.; 3 Jul. 2018; *P.W. Moonlight 1251*; E, USM • ibid.; 1469 m a.s.l.; 5°54′14”S, 78°4′40”W; 3 Jul. 2018; *P.W. Moonlight 1252*; E, USM • ibid.; 1520 m a.s.l.; 5°54′13”S, 78°4′33”W; 3 Jul. 2018; *P.W. Moonlight 1253*; E, USM. – **Cajamarca Region: Prov. Chota** • Chalamarca; [6°30′ S, 78°31′ W]; 2400 m a.s.l.; 29 Dec. 2012; *L. García Llatas 9594*; USM. – **Prov. Celendín** • El Porvenir, al SE de la Quintilla; [6°58′ S, 78°06′ W]; 2750 m a.s.l.; 25 Feb. 1986; *I. Sánchez V. 3991*; CPUN.

**Description**

Acaulescent, tuberous herb, to 30 cm high. *Tuber* sub-globose, 1.5–4 × 1.5–5 cm, with 1 growing point. *Stipules* late deciduous, lanceolate, ca 8 × 5 mm, apex acute, apiculate, translucent, white to pink, glabrous, margin entire, aciliate. *Leaves* 1–5, alternate, basifixed or peltate; petiole to 18 cm long, pink to red, glabrous; blade subsymmetric, orbicular, to 10.5 × 8.5 cm, succulent, apex rounded, base peltate and notched to cordate, basal lobes overlapping to not overlapping, sinus to 15 mm deep, margin irregularly crenate, aciliate, upper surface green, glabrous, lower surface very pale green, glabrous, veins peltate or palmate, 6–8 veined from the base. *Inflorescences* 1–3, bisexual, axillary, erect, a dichasial or monochasial cyme, with 1 branch, bearing up to 4 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 28 cm long, white to pink, glabrous, bracts late deciduous, lanceolate, ca 6 × 3.5 mm, translucent, pale green, glabrous, apex obtuse, margin entire, aciliate. *Staminate flowers*: pedicels to 28 mm long, glabrous; tepals 4, spreading, outer two narrowly ovate, 7–12 × 4–11 mm, apex rounded, white, glabrous, margin entire, aciliate, inner two oblanceolate, 10–11 × 6 mm, apex truncate, sometimes notched, white, glabrous, margin entire, aciliate; stamens 11–16, projecting, yellow, filaments ca 1 mm long, united into a 1–2 mm column, anthers linear, ca 2 × 1 mm long, dehiscing by lateral slits, connectives not extending, symmetrically basifixed. *Pistillate flowers*: pedicels to 30 mm long; bracteoles 2, positioned directly below the ovary, elliptic to narrowly lanceolate, 1–1.5 × 0.5 mm, apex rounded, translucent, pale green, glabrous, margin entire, aciliate; tepals 5, persistent in fruit, spreading, the largest oblanceolate to obovate, ca 11 × 9 mm, apex truncate to rounded, white, glabrous, margin entire, aciliate, the smallest obovate, ca 9 × 5 mm, apex truncate to rounded, white, glabrous, margin entire, aciliate; ovary body ovoid, 8–9 × 5–7 mm, light green, glabrous, unequally 3-winged, wings triangular, largest 10–13 × 9–14 mm, smallest 5–6 × 9–11 mm; 3-locular, placentae branches entire, bearing ovules on both surfaces; styles 3, yellow, free, 2–3 mm long, 4-lobed, stigmatic papillae in a band around the lobes. *Fruiting pedicel* to 25 mm long. *Fruit body* globose, to 6 × 6 mm, drying brown, wings same shape as in ovary, expanding to 25 mm tall.

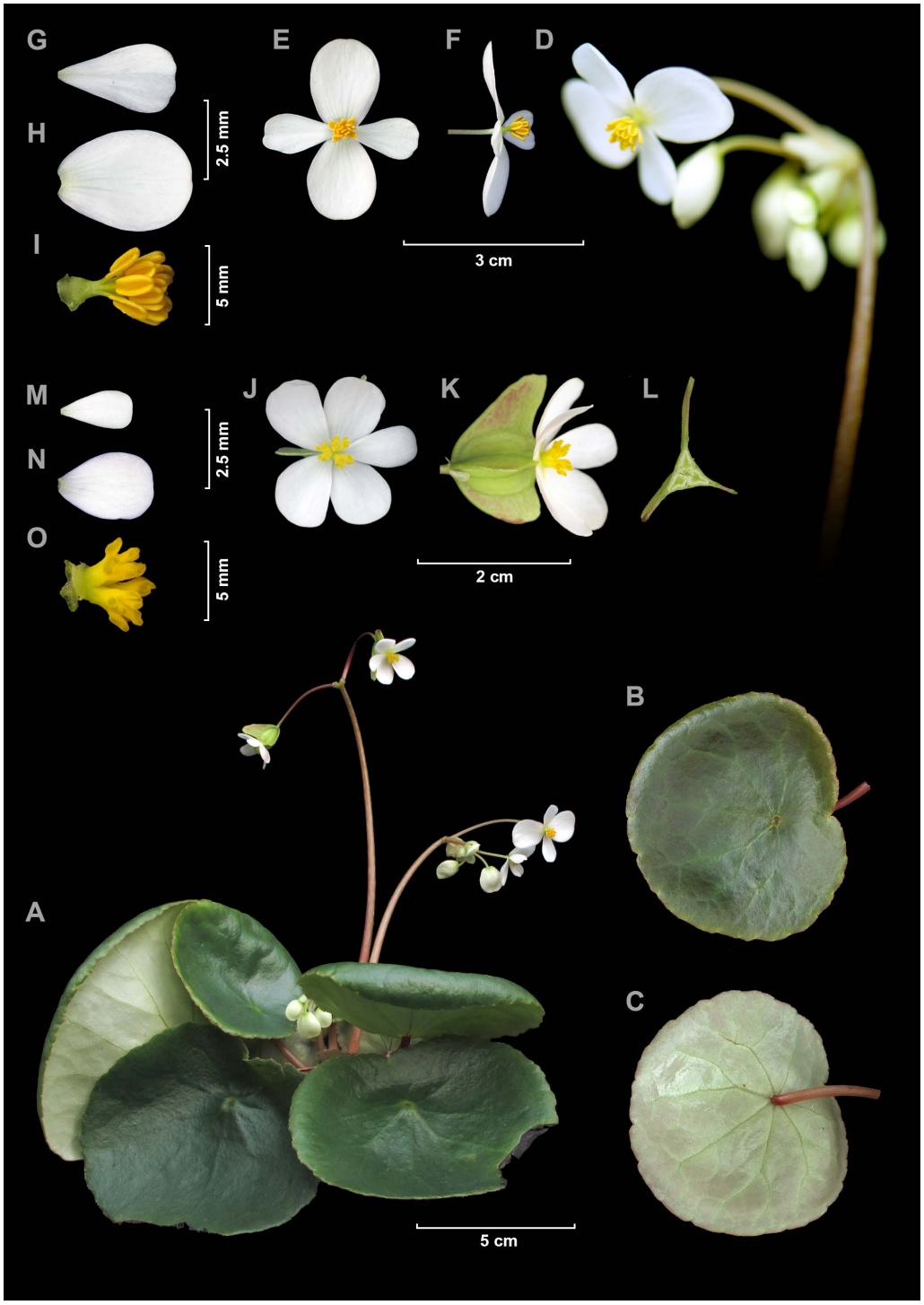


**Fig. 50.** *Begonia joshii* Moonlight. **A**. Habit. **B**. Leaf, adaxial surface. **C**. Leaf, abaxial surface. **D**. Inflorescence. **E**. Staminate flower, front view. **F**. Staminate flower, side view. **G**. Smallest tepal of staminate flower. **H**. Largest tepal of staminate flower. **I**. Androecium, side view. **J**. Pistillate flower, front view. **K**. Pistillate flower, side view. **L**. Cross section of ovary. **M**. Smallest tepal of pistillate flower. **N**. Largest tepal of pistillate flower. **O**. Pistils, side view. All photographs taken by D.A. Purvis in the living collections of the Royal Botanic Garden Edinburgh (Accession 20180923, grown from seeds collected as part of *P.W. Moonlight 1253*). Reproduced from Moonlight *et al.* (2020), with the permission of *Edinburgh Journal of Botany*.

**Proposed conservation assessment**

Assessed by Moonlight *et al.* (2020) as Data Deficient (DD) because it was not possible to survey similar habitats close to the type locality for the species' presence. We have since identified two further populations of *B. joshii* in Cajamarca Region and visited so feel confident in suggesting a conservation assessment. The species is known from < 5 locations and has an EOO of < 5000 km$^2$. The population in Amazonas Region and the population in Celendin Province, Cajamarca Region both had > 2500 individuals when visited in July 2018 and December 2021, respectively. However, all three known populations are within degraded seasonally dry tropical forest habitats. We assess *B. joshii* as Endangered (EN B1ab(iii)).

**Notes**

We expand the earlier circumscription of *B. joshii* to include two populations in Cajamarca Region, which have basifixed leaves much more frequently than the populations in Amazonas. The species remains distinct from *B. neoharlingii* and *B. geraniifolia* on account of lack of an above-ground stem; and its thicker, more succulent leaves that always lack lobes. It further differs from *B. geraniifolia* in its bracteolate pistillate flowers.

**Identification notes**

The only tuberous species of northern Peruvian *Begonia* with leaves that are circular in outline and lack any lobes.

**Distribution and ecology**

Endemic to Peru and known from Amazonas and Cajamarca Regions (Fig. 48A). Found in dry forests at an elevation of 1441–2600 m a.s.l. *Begonia joshii* has been collected on vertical rock faces, which are wet in the dry season. The species is tuberous and dies back in the dry season to its tuber.

33. ***Begonia neoharlingii*** L.B.Sm. & Wassh.
Figs 48B, 51

*Begonian* 52: 11 (Smith & Wasshausen 1985). – **Type**: ECUADOR – **Prov. Loja** • Between Cariamanga and Pozoranga; [4°19′ S, 79°39′ W]; 2000 m a.s.l.; 12 Nov. 1982; *G. Harling, J.-E. Bohlin, M. Lindström & S. Roth 20648*; holotype: GB [GB0058016]; isotype: US [US00221785].
Smith & Wasshausen (1986: 55); Quintana & León-Yáñez (2011: 200).
*Begonia geraniifolia* auct. non Hook.: R.Vásquez *et al.*, *Arnaldoa* 12 (1–2): 112–125 (Vásquez *et al.* 2005).

**Etymology**

The epithet refers to Gunnar Wilhelm Harling, the Swedish botanist who collected the type specimen of the species. The epithet *harlingii* was unavailable following the 1979 publication of *B. harlingii* L.B.Sm. & Wassh. thus the authors added the suffix '*neo*' meaning 'new'.

**Specimens examined**

PERU – **Piura Region: Prov. Ayabaca** • Dist. Ayabaca, road to Ayabaca; 4°52′26″ S, 79°47′39″ W; 2051 m a.s.l.; 27 May 2015; *M.C. Tebbitt & A. Daza 840*; E, MOL. – **Prov. Huancabamba** • above Canchaque on the Huancabamba Pass; 5°22′08″ S, 79°34′26″ W; 1835 m a.s.l.; 26 Jan. 2016; *P.W. Moonlight & A. Daza 109*; E [E00885872], MOL • ibid.; 5°22′34″ S, 79°34′33″ W; 2122 m a.s.l.; 27 Jan. 2016; *P.W. Moonlight & A. Daza 116*; E [E00885881], MOL. – **Cajamarca Region: Prov. San Miguel** • Alrededores Distrito San Gregorio; [7°03′ S, 79°06′ W]; 1750 m a.s.l.; 14 Feb. 2000; *E. Alvítez*

*I., E. Rodríguez R. & S. Leiva G. 1119*; HUT. – **Prov. Cajamarca** • ca 22 km S of Cajamarca on road to Chilete; [7°17′ S, 78°31′ W]; ca 2740 m a.s.l.; 19 Jan. 1983; *M.O. Dillon, U. Molau & P. Matekaitis 3025*; F, GB [GB0058013], NY, USM • Entre San Juan y Paso El Galiván, abajo de Chotén; [7°17′ S, 78°31′ W]; 2700 m a.s.l.; 15 Feb. 1985; *I. Sánchez Vega 3696*; CPUN. – **Prov. Contumazá** • Quebrada de Canrra, (Contumazá-Toledo); [7°15′ S, 78°51′ W]; 2200 m a.s.l.; 5 Apr. 1985; *M. Guzman, S. Leiva G. & C. Tellez 12654*; HUT, MO [MO-098205] • Entrada al Bosque Cachil; [7°24′ S, 78°47′ W]; 2500 m a.s.l.; 16 Feb. 1995; *A. Sagástegui A. & S. Leiva G. 15518*; CPUN, F, MO [MO-1642685], NY • ca 20 km S of Contumazá, 2160–2210 m a.s.l.; 7°25′ S, 78°25′ W; 2160–2210 m a.s.l.; 14 Apr. 1986; *M.O. Dillon, D. Dillon & A. Sagástegui A. 4529*; F, US [US00446634]. – **La Libertad Region: Prov. Otuzco** • Llacmón, Siniscap; [7°51′ S, 78°46′ W]; 2500 m a.s.l.; 21 Feb. 1953; *M. Vargas 1*; US [2: US00222141, US00222143] • 60 km from Trujillo, 7°56′ S, 78°36′ W; 2040 m a.s.l.; 12 Feb. 1983; *D.N. Smith & R. Vásquez 3237*; MO [MO-098021], USM • Arriba de Plazapampa (El Revolcadero); [7°59′ S, 78°39′ W]; 2260 m a.s.l.; 4 Mar. 1999; *S. Leiva G. 2260*; HUT. – **Prov. Trujillo** • km 62 entre Agaypampa y Samne; [8°00′ S, 78°40′ W]; 2100–2200 m a.s.l.; 17 Mar. 1948; *R. Ferreyra 3083*; USM. – **Huánuco Region: Prov. Huánuco or Pachitea** • 1900–3700 m a.s.l.; *R.M. Bird 1469*; MO [MO-2228063]. – **Prov. Pachitea** • Panao; 2700–2800 m a.s.l.; [9°54′ S, 76°03′ W]; 3 May 1947; *R. Ferreyra 1764*; USM. – **Cusco Region: Prov. Urubamba** • Phuyupatamarca; [13°12′ S, 72°32′ W]; 2200–3800 m a.s.l.; 29 Feb. 1942; *J.C. Vargas Calderón 2772*; MO [MO-2218601, mixed collection]. – **Apurimac Region: Prov. Cotabambas** • Cotabambas; [13°45′ S, 72°22′ W]; 3500 m a.s.l.; 27 Nov. 1984; *I. Carlier 281*; USM.

**Description**

Caulescent, rhizomatous herb, to 40 cm high. *Rhizome* ellipsoid, 2–4 × 1–2 cm, with 1–3 growing points. *Stem* erect, rarely branching; internodes to 22 cm long, to 10 mm thick, succulent, red, glabrous or rarely villous. *Stipules* deciduous, triangular, ca 4 × 3 mm, apex acute, opaque, pale green, glabrous, margin entire, aciliate. *Leaves* 2–4, alternate, basifixed or rarely peltate (*P.W. Moonlight & A. Daza* 109 and 106); petiole 1.5–10 cm long, red, glabrous or rarely villous; blade subsymmetric, ovate, to 7 × 7 cm, succulent, apex indistinct and rounded to acute, base cordate, basal lobes not overlapping or overlapping, sinus to 2 mm deep, margin crenate to dentate, aciliate, rarely with up to 3 irregular, triangular lobes, upper surface green, glabrous, lower surface red, glabrous or rarely villous on the veins, veins peltate or palmate, 6–8 veined from the base. *Inflorescences* 1–2 per stem, bisexual, axillary, erect, cymose, with 6 branches, bearing up to 4 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 27 cm long, red, glabrous, bracts late-deciduous, ovate, 4–12 × 2–5 mm, translucent, pale green, glabrous, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 3.5 mm long, glabrous; tepals 4, spreading, outer 2 ovate, 10–30 × 9–12 mm, apex acute to obtuse, white to pink, glabrous, margin entire, aciliate, inner 2 obovate, 10–25 × 9–20 mm, apex truncate, often with two rounded apical lobes, pink, glabrous, margin entire, aciliate; stamens 10–15, spreading, yellow, filaments 1–3 mm long, fused at the base, anthers broadly ovate, ca 0.5 × 0.5 mm long, dehiscing via lateral slits, connectives not extending, symmetrically basifixed. *Pistillate flowers*: pedicels to 20 mm long; bracteoles 2, positioned directly beneath the ovary, ovate, 2–3 × 1–2 mm, translucent, pale green, apex acute, margin entire, aciliate; tepals 5, subequal, persistent in fruit, spreading, the largest obovoid, 4–15 × 3–10 mm, apex truncate, often with two rounded lobes, white to pink, glabrous, margin entire, aciliate, the smallest oblanceolate, 4–15 × 2–6 mm, apex acute, white to pink, glabrous, margin entire, aciliate; ovary body cuboid, 2.5–4 × 2.5–4 mm, green flushed red, glabrous, sub-equally 3-winged, wings narrow-triangular, 8–12 × 2–4 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 3–7 mm long, 4–6 times divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 45 mm long. *Fruit body* cuboid, to 4 × 8 mm, drying brown, wings same shape as in ovary, expanding to 6 × 12 mm.

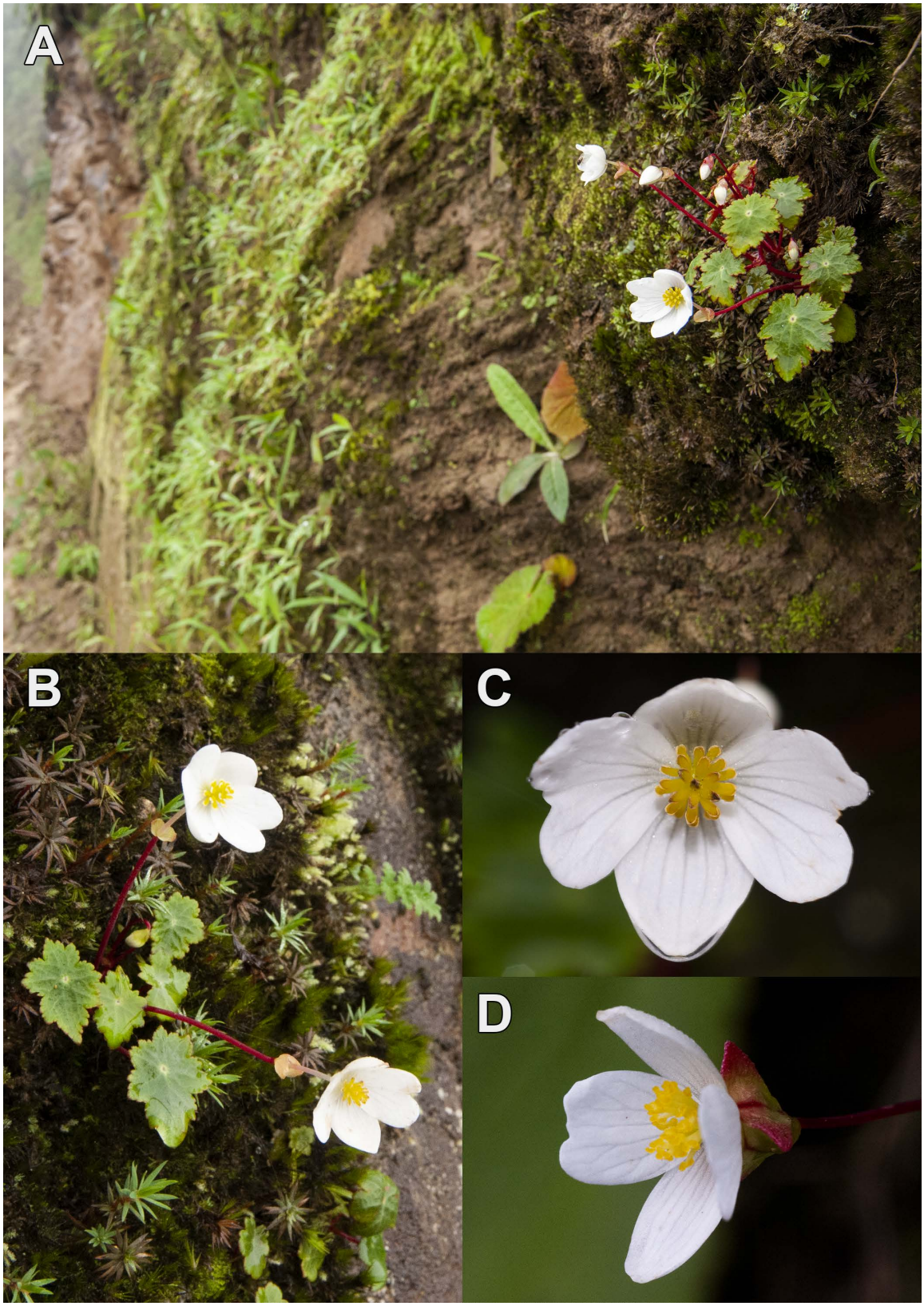


**Fig. 51.** *Begonia neoharlingii* L.B.Sm. & Wassh. **A**. Habitat. **B**. Habit. **C**. Staminate flower, front view. **D**. Pistillate flower, side view. All photographs taken by P.W. Moonlight from *P.W. Moonlight & A. Daza 109* (C) and *116* (A, B, D) in Huancabamba Province, Piura Region.

**Proposed conservation assessment**

Widespread but rarely collected in the Peruvian and southern Ecuadorian Andes. This may reflect rarity, but we consider it more likely that it is frequently overlooked. Most botanical collecting is carried out in the dry season when *B. neoharlingii* is dormant. For example, the first *Begonia* collections were made on the Huancabamba pass above Canchaque in 1939 and this locality has been regularly visited since. The first collections of *B. neoharlingii* were made above Canchaque in 2016, and we estimate there were > 100 000 individuals along a 10 km section of road. Given the species' large EOO (> 130 000 km$^2$), we assess *B. neoharlingii* as Least Concern (LC).

**Notes**

There is a large disjunction in the distribution of *B. neoharlingii* between a northern population found from Ecuador to Huánuco Region and a southern population found in Cusco and Apurimac Regions. There are clear morphological differences between these populations. The southern population differs in its villous (vs glabrous) indumentum and its leaves with a serrate margin and triangular lobes (vs a usually crenate margin and rarely lobed leaves). These differences may be sufficient to merit taxonomic recognition but, given the little material available for the southern population (two collections), we prefer to wait for genetic data before recommending taxonomic changes.

**Identification notes**

*Begonia neoharlingii* is most similar to *B. geraniifolia* (see Identification notes for *B. geraniifolia*) but in the south of its range could be confused with *B. veitchii*. Both species grow at high elevations in Cuzco and Apurimac Regions and, considering the collection *J.C. Vargas Calderón 2772* is a mixed collection of the two species, may live sympatrically. When in flower, they are simple to distinguish. The styles of the pistillate flower of *B. neoharlingii* are multifid (vs bifid) and the inner two tepals of the staminate flower have an emarginate apex, with two rounded lobes (vs with a rounded apex). When sterile, *B. neoharlingii* is best distinguished by its large, aerial stem with internodes reaching 22 cm in length, and usually at least 5 cm long. In contrast, *B. veitchii* often has subterranean stems and, when it does have an aerial stem, the internodes only reach 1.5 cm in length.

**Distribution and ecology**

Known from Ecuador and Peru. Within Peru, collected in Piura, Cajamarca, La Libertad, Huánuco, Cuzco, and Apurimac Regions (Fig. 48B). Found within northwest Peruvian relict montane forest and middle and upper montane forest at an elevation of 1750–3500(–3800 m a.s.l.). *Begonia neoharlingii* lives in relatively seasonal areas within these vegetation types, most of which derive their moisture from wind driven fog in the rainy season. It survives the dry season by dying back entirely to its geophytic root stock.

### 34. ***Begonia weberbaueri*** Irmsch.
Fig. 48B

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 78 (Irmscher 1953). – **Type**: PERU – **Cajamarca Region: [Prov. San Pablo]** • uber San Pablo; [7°07′ S, 78°50′ W]; 2400–2700 m a.s.l.; 26 Apr. 1904; *A. Weberbauer 3824*; lectotype: B [B100186582], **designated here**; isolectotypes: B [B100186581], G [G00034148].

León & Monsalve (2006: 170).

*Begonia lichenoides* L.B.Sm. & B.G.Schub., *Publicaciones del Museo de Historia Natural Javier Prado, Serie B, Botánica* 17: 10 (Smith & Schubert 1964). – **Type**: PERU – **Cajamarca Region** • uber San Pablo; [7°07′ S, 78°50′ W]; 2400–2700 m a.s.l.; 26 Apr. 1904; *A. Weberbauer 3824*; holotype: G [G00034148]; isotypes: B [B100186581, B100186582].

Smith & Wasshausen (1984: 468).

### Etymology

The type collection was collected by August Weberbauer and the species is named in his honour.

### Selected specimens examined

PERU – **Cajamarca Region: Prov. Cajamarca** • Cumbre El Gavilán, entre Chilete y Cajamarca; [7°14′ S, 78°28′ W]; 3200 m a.s.l.; 31 Mar. 1948; *R. Ferreyra 3282*; USM • Dist. Cajamarca, sobre la cima de la ladera occidental; 7°14′01.5″ S, 78°29′24″ W; 3270 m a.s.l.; 20 Mar. 2003; *I. Sánchez V., M. Sánchez M., R. Cueva R. & J. Montoya 11766*; CPUN • El Molino (San Pablo); [7°17′ S, 78°48′ W]; 2320 m a.s.l.; 22 May 1975; *A. Sagástegui A., C. Cabanillas S., O. Dias C. 8003*; HUT, MO [MO-2228052], US [US00424972]. – **Prov. San Pablo** • On the path to El Molino, caserillo El Cevil; 7°13′48″ S, 78°29′25″ W; 3280 m a.s.l.; 24 Apr. 2007; *T.E. Särkinen, C.E. Hughes, A. Daza & H.M. Baden 2216*; E [E00607545], K, USM. – **Prov. Cotumazá** • ca 1 km east of and below San Pablo by Trail; [7°07′ S, 78°50′ W]; ca 2550 m a.s.l.; 13 May 1964; *P.C. Hutchinson & J.K. Wright 5063*; F, K, MO [MO-2228066], NY, US [US00222344], USM • Arriba de Cotumazá; [7°22′ S, 78°48′ W]; 2700 m a.s.l.; 24 Apr. 1966; *A. Sagástegui A.& M. Fukuskima 6109*; HUT • Road between Cascas and Cotumazá; 7°24′16″ S, 78°47′29″ W; 2669 m a.s.l.; 23 May 2015; *M.C. Tebbitt & A. Daza 829*; E, MOL. – **La Libertad Region: Prov. Otuzco** • San Pedro (Mótil); [7°59′ S, 78°30′ W]; 3000 m a.s.l.; 7 Jun. 1997; *M. Rodríguez E. 155*; HUT.

### Description

Acaulescent, rhizomatous herb, to 25 cm high. *Rhizome* ellipsoid, 5–10 × 1.5–2 cm, with 1 growing point. *Stipules* persistent, triangular, 8–10 × 6 mm, apex acute, opaque, dark brown, glabrous, margin entire, aciliate. *Leaves* 1–3, alternate, basifixed; petiole 7–18 cm long, pale green, sparsely to densely villous; blade subsymmetric, ovate, to 10 × 13 cm, succulent, apex acuminate, base cordate, basal lobes overlapping or not overlapping, sinus to 2.5 mm deep, margin serrate, with > 10 to deeply-incised lobes, ciliate, upper surface pale green, densely pilose, lower surface pale green, glabrous, veins palmate-pinnate, 6–8 veined from the base. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with 3 branches, bearing up to 2 staminate flowers and 1 pistillate flowers, protandrous; peduncle to 20 cm long, green to pink, glabrous to densely villous, bracts persistent, ovate, 3–10 × 2–9 mm, opaque, glabrous, apex obtuse, margin entire, ciliate. *Staminate flowers*: pedicels to 35 mm long, sparsely-villous; tepals 4, spreading, outer 2 ovate, 22–28 × 15–19 mm, apex rounded, white, glabrous, margin entire, aciliate, inner 2 ovate, 13–24 × 13–17 mm, apex truncate, white, glabrous, margin entire, aciliate; stamens ca 25, spreading, yellow, filaments 2–4 mm long, free, anthers ovoid, 0.8–1 × 0.8 mm long, dehiscing via lateral slits, connectives not extending, symmetrically basifixed. *Pistillate flowers*: pedicels to 10 mm long; bracteoles lacking; tepals 5, subequal, persistence in fruit, spreading, the largest ovate, ca 17 × 9 mm, apex rounded, white, glabrous, margin entire, aciliate, the smallest ovate, ca 10 × 9 mm, apex rounded, white, glabrous, margin entire, aciliate; ovary body ovoid, ca 10 × 8 mm, pale green, glabrous, unequally 3-winged, the largest wing triangular ca 10 × 7 mm, smallest marginal and 1 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 5 mm long, 2-lobed, the lobes reniform, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 10 mm long. *Fruit body* ovoid, to 10 × 8 mm, drying dark brown, wings same shape as in ovary, expanding to 8 mm tall.

### Proposed conservation assessment

Assessed by León & Monsalve (2006) as Data Deficient (DD). We have now identified specimens of the species from five localities in Cajamarca and La Libertad Regions, with a combined EOO of > 2000 km$^2$.

The species prefers limestone outcrops in Dry Forest habitats, many of which are mined for concrete and are highly degraded throughout its range. We assess *B. weberbaueri* as Endangered (EN B1ab(iii)).

**Typification notes**

The protologue of *B. weberbaueri* states that the type collection is held in Berlin (Irmscher 1953: 78). This herbarium holds two duplicates of the type gathering thus one of these must be chosen as a lectotype (McNeill 2014). We choose the specimen barcode B100186582 as it has a larger number of flowers than the alternative.

**Identification notes**

*Begonia weberbaueri* is the only species of Peruvian *Begonia* with > 10 deeply incised lobes around the edge of the leaf laminae.

**Distribution and ecology**

Endemic to Peru and known from Cajamarca and La Libertad Regions (Fig. 48B). Found in dry forests and scrublands at an elevation of 2550–3600 m a.s.l. *Begonia weberbaueri* Irmsch. dies back to its rhizome in the dry season and flowers in the wet season (March to June).

### *The octopetala group of Begonia sect. Eupetalum*

Tebbitt (2015) defined the octopetala group of *B.* sect. *Eupetalum* to include the members of the section with multifid styles, symmetric leaf blades, and no above ground stems. Most members of the group also have > 4 tepals on the staminate flowers, > 5 tepals on the pistillate flower, and asymmetric to subsymmetric wings on their ovaries and fruits. Of the ten species in the group, six are found in Peru and two are endemic.

#### 35. ***Begonia anemoniflora*** Irmsch.
Figs 52A, 53

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76 (1): 7 (Irmscher 1953). – **Type**: PERU – **Junín Region: Prov. Tarma** • Entre Huacapistana y Palca; 2000 m a.s.l.; 1903; *A. Weberbauer 2015*; lectotype: B [B100186696], **designated here**; isolectotype: MOL [MOL0002990] • Prov. Tarma: oberhalb Huacapistana; [11°15′ S, 75°32′ W]; 1700–2200 m a.s.l.; 29 Nov. 1902; *A. Weberbauer 1764*; syntype: B [B100186695].

Brako & Zarucchi (1993: 191); León & Monsalve (2006: 165); Tebbitt (2015: 480).

**Etymology**

Named for the superficial resemblance of the species' flowers to those of anemones (*Anemone* L., Ranunculaceae).

**Specimens examined**

PERU – **Pasco Region** • Huánuco, ca 80 km cerro de Pasco, 40° N, 3265 m a.s.l.; 10 Jan. 1971; *H. Ellenberg 4003*; US [US00289144]. – **Junín Region: Prov. Tarma** • above Huacapistana; [11°14′ S, 75°31′W]; 1981 m a.s.l.; Oct. 1943; *C. Sandeman 4512*; GH, K [K000374270], OXF. – **Prov. Concepción** • Dist. Comas, route from Concepción to Comas, km 93; 11°37′41″ S, 75°01′36″ W; 3661 m a.s.l.; 13 Feb. 2016; *P.W. Moonlight & A. Daza 226*; E [E00885566] • ibid., km 45; 11°44′23″ S, 75°07′38″ W; 3580 m a.s.l.; 12 Feb. 2016; *P.W. Moonlight & A. Daza 223*; E [E00885595], MOL • ibid., km 42; 11°45′52″ S, 75°08′39″ W; 3852 m a.s.l.; 12 Feb. 2016; *P.W. Moonlight & A. Daza 222*; E [E00885603], MO, MOL • Dist. Comas, road from Comas to Satipo; 11°41′43″ S, 75°04′20″ W; 3313 m a.s.l.; 12 Feb.

2016; *P.W. Moonlight & A. Daza 225*; E [E00934209], G, MO [MO-3254780], MOL. – **[Prov. Yauli]** • Vicinity of Oroya; [11°31′ S, 75°53′ W]; 3657 m a.s.l.; *A.S. Kalenborn 104*; US [US00222272] • Dist. Oroya; [11°42′ S, 75°05′ W]; *J.C. Vargas Calderón 6586*; CUZ.

## Description

Acaulescent, rhizomatous herb, to 30 cm high. *Rhizome* elongate, to 10 × 1 cm, with 1 growing point. *Stipules* persistent, triangular, 5–10 × 5 mm, apex acute, opaque, brown, glabrous, margin entire,

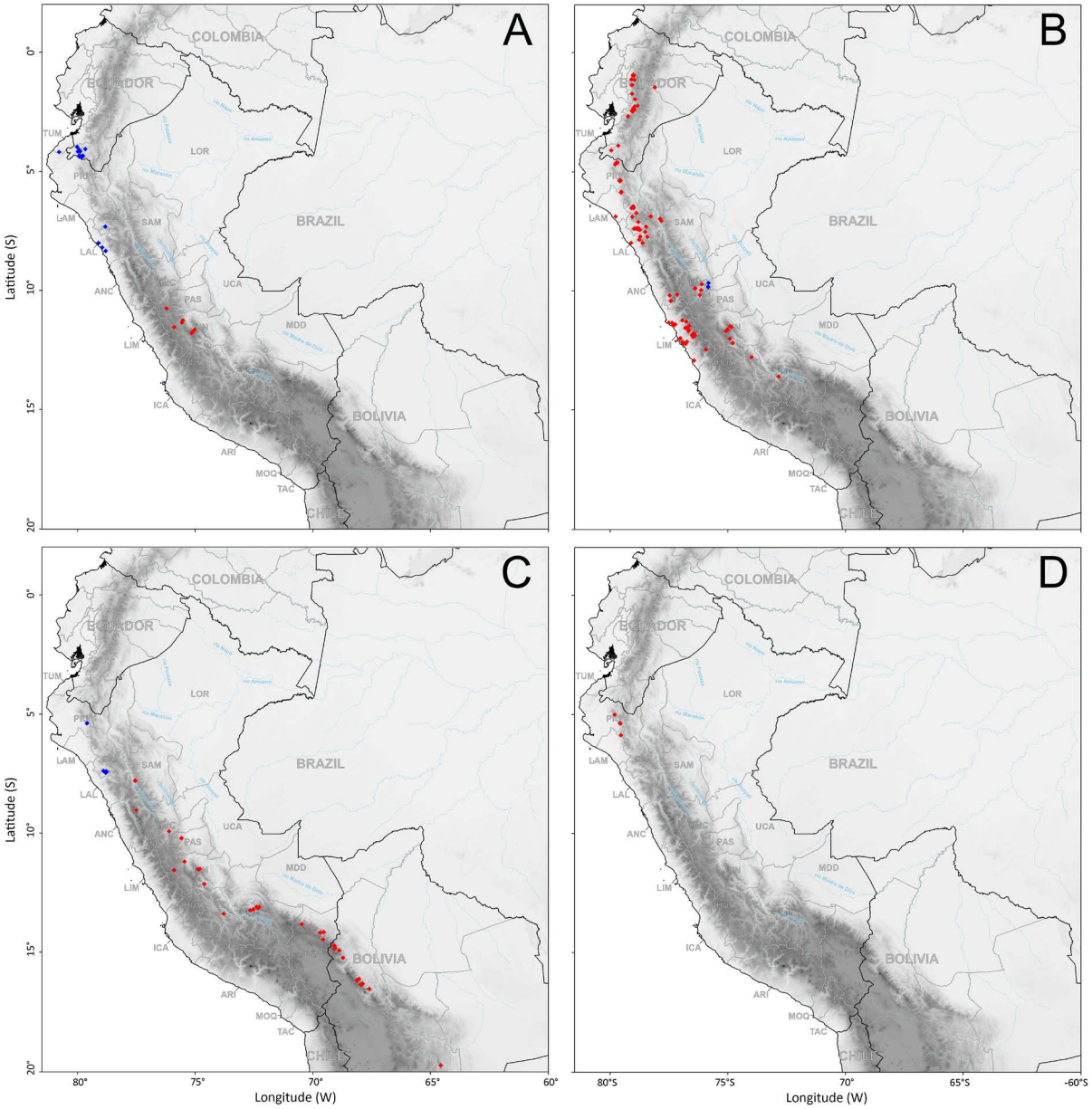


**Fig. 52.** Distribution of the octopetala group of *Begonia* sect. *Eupetalum* (Lindl.) A.DC. in Peru and surrounding countries. **A**. *B. anemoniflora* Irmsch. (red) and *B. tumbezensis* Irmsch. (blue). **B**. *B. octopetala* L.Hér. subsp. *octopetala* (red) and *B. octopetala* subsp. *ovatiformis* Irmsch. (blue). **C**. *B. pleiopetala* A.DC. (red) and *B. pseudopleiopetala* Tebbitt (blue). **D**. *B. polypetala* A.DC. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

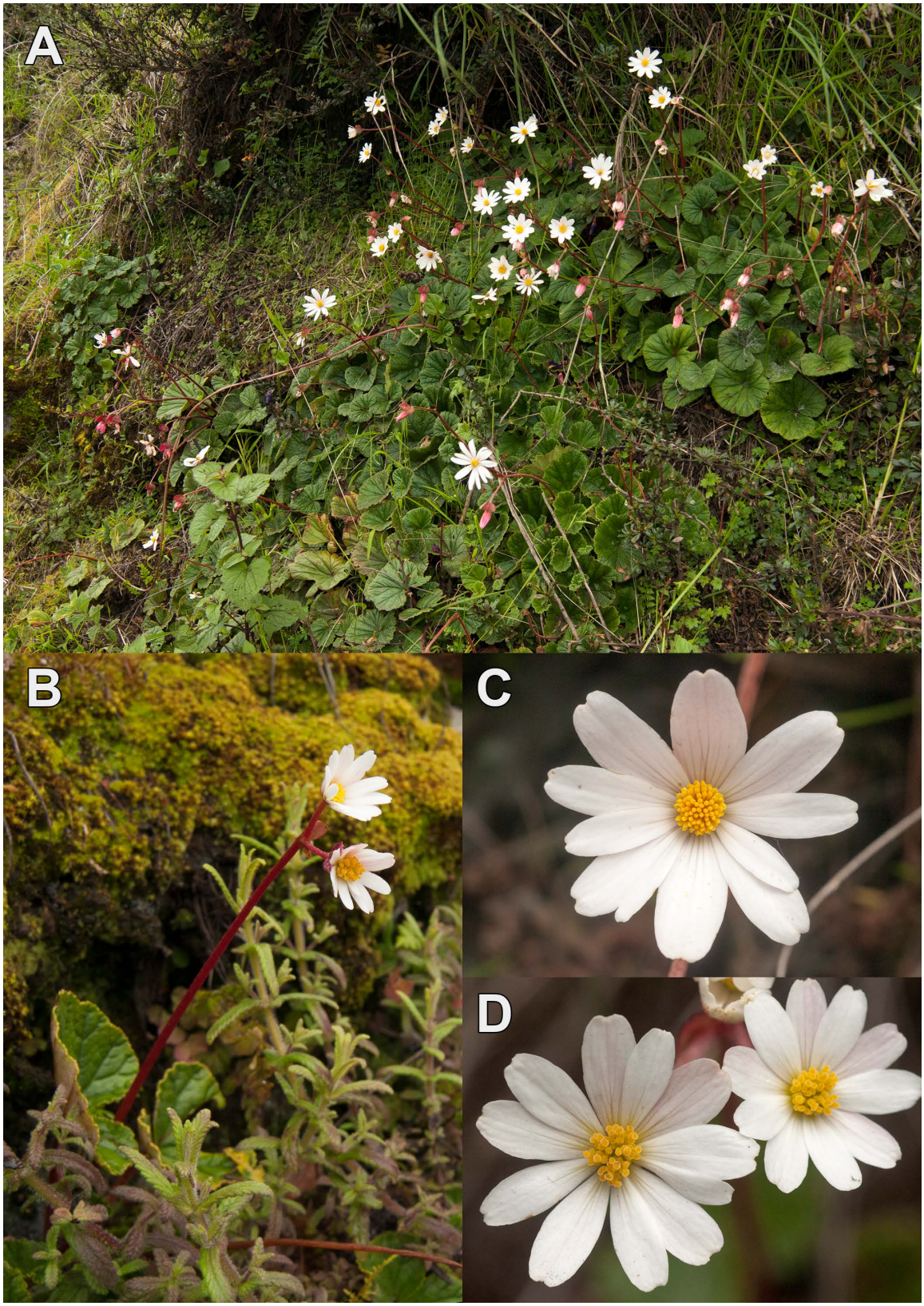


**Fig. 53.** *Begonia anemoniflora* Irmsch. **A**. Habitat. **B**. Habit. **C**. Staminate flower, front view. **D**. Pistillate flowers, front view. All photographs taken by P.W. Moonlight from *P.W. Moonlight & A. Daza 222* (C, D), *223* (A), and *225* (B) in Concepción Province, Junín Region.

aciliate. *Leaves* 1–5, alternate, basifixed; petiole 3–20 cm long, red, villous to densely villous; blade subsymmetric, ovate, to 6 × 6.5 cm, succulent, apex indistinct, rounded, base cordate, basal lobes not overlapping, sinus to 3 cm deep, margin dentate, ciliate, upper surface mid to dark green, pilose, lower surface pale green to red, villous to densely villous, veins palmate, 5–7 veined from the base. *Inflorescences* 1, bisexual, axillary, erect, cymose, with 2 branches, bearing up to 1 staminate flower and 2 pistillate flowers, protandrous; peduncle to 35 cm long, red, villous, bracts late deciduous, elliptical, 8–12 × 4 mm, opaque, red, villous to glabrous, apex truncate, margin entire, aciliate. *Staminate flowers*: pedicels to 45 mm long, villous; tepals 8–12, spreading, elliptic, 9–20 × 1–7 mm, apex emarginate, white to pink, glabrous, margin entire, aciliate; stamens 40–60, spreading, yellow, filaments 1–1.5 mm long, free, anthers oblong, 1–1.5 × ca 0.5 mm long, dehiscing through lateral slits, connectives extending to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 35 mm long; bracteoles lacking to 2, positioned directly beneath the ovary, lanceolate, 1.5–3 × 1–1.5 mm, apex acute, opaque, white, villous, margin entire, aciliate, tepals 8–10, subequal, late-deciduous in fruit, spreading, elliptic, 4–15 × 1.5–5 mm, apex emarginate, white to pink, glabrous inside, villous outside, margin entire, aciliate; ovary body ovoid, 3.5–8 × 3.5–8 mm, red, villous, unequally 3-winged, largest wing triangular, 4–9 × 3–8 mm, smallest wings a 1 mm wide ridge around the ovary; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2–4 mm long, ca 8-lobed, stigmatic papillae in a spiral band. *Fruiting pedicel* to 40 mm long. *Fruit body* ovoid, to 8 × 8 mm, drying brown, wings same shape as in ovary, the largest expanding to 10 × 12 mm, the smallest expanding to a 2 mm wide ridge, sometimes wider towards the fruit apex.

**Proposed conservation assessment**

Assessed by León & Monsalve (2006) as Data Deficient (DD). We were unable to locate this species in either Pasco Region or Tarma Province of Junín Region, but it is common in Concepción Province of Junín, and we observed > 10 000 individuals along and surrounding a 10 km section of road. Now known from an EOO of ca 2500 km$^2$. No threats were observed to the species in Concepción Province, but due to our inability to relocate populations elsewhere, we assess *B. anemoniflora* as Endangered (EN B1ab(iv)).

**Notes**

The collections made in Concepción Province, Junín Region by Moonlight & Daza in 2016 are from a different population to all earlier collections of *B. anemoniflora*. Specimens in this population have a much sparser indumentum and much larger flowers to plants collected elsewhere. We suspect this may be because *B. anemoniflora* has hybridised with *B. octopetala* in this habitat, with which it grows sympatrically. We also record bracteoles on plants of *B. anemoniflora* for the first time in this population (*P.W. Moonlight & A. Daza 225*).

**Typification notes**

Irmscher cited the collections *A. Weberbauer 1764* and *2015* in the protologue of *B. anemoniflora* but did not specify a type or cite an herbarium for either specimen (Irmscher 1953: 76). It is therefore appropriate to choose a lectotype. We designate *A. Weberbauer 2015* in Berlin (B100186696) as the lectotype for *B. anemoniflora* because this specimen was seen and determined by Irmscher, it is a high-quality specimen, and there is also a duplicate of this specimen in the Weberbauer herbarium in Peru.

**Identification notes**

*Begonia anemoniflora* is unique among members of the octopetala group of *B.* sect. *Eupetalum* in having distinctly emarginate (notched) apices to the staminate tepals.

Tebbitt (2015) distinguished *B. anemoniflora* from the Bolivian and Argentinian *B. marinae* Tebbitt by its greater number of tepals on the staminate flower; its white to pink (vs uniformly bright pink) tepals; its smaller leaf blades; and its ovary lacking bracteoles. We have since collected specimens of *B. anemoniflora* with bracteoles, but the other distinguishing characters used by Tebbitt still hold.

**Distribution and ecology**

Endemic to Peru and known from Pasco and Junín Regions (Fig. 52A). Found in upper montane forest and high elevation grasslands at an elevation of 1980–3850 m a.s.l. From early collections, it was suspected that *B. anemoniflora* would be located growing on limestone or perhaps wet cliffsides in montane forest. During fieldwork in 2016, the authors observed this species growing on wet but well-drained acidic soils in full sunshine. The species has flowers that resemble several members of the Asteraceae and it is possible that *B. anemoniflora* resembles these species in order to deceive pollinators.

## 36. ***Begonia octopetala*** L'Hér.

*Stirpes Novae aut Minus Cognitae* 4: 101 (L'Héritier de Brutelle 1788). – *Huszia octopetala* (L'Hér.) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 121 (Klotzsch 1854). – **Type**: PERU – **Lima Region** • *J. Dombey s.n.*; lectotype: P [P00482218], designated by Smith & Wasshausen (1979: 243).

**Key to the subspecies of *Begonia octopetala***

1a Leaf lamina broadly ovate in outline, rarely triangular; staminate flowers with 6–11 tepals; largest wing of the ovary and fruit not ascending ..... ***Begonia octopetala*** subsp. ***octopetala*** **36.1**

1b Leaf lamina triangular in outline; staminate flowers with six tepals; largest wing of the ovary and fruit strongly ascending ..... ***Begonia octopetala*** subsp. ***ovatiformis*** Irmsch. **36.2**

### 36.1 ***Begonia octopetala*** subsp. ***octopetala***

Figs 52B, 54

Hooker (1837: t. 3559); Klotzsch (1855: 135); Walpers (1858: 874); de Candolle (1864: 283); Smith & Schubert (1941a: 195, 1950: 86, 1952: 39); Smith & Wasshausen (1986:28); Brako & Zarucchi (1993: 194); Tebbitt (2015: 483).

*Begonia grandiflora* Knowles & Wescott nom superfl., *Floral Cabinet, and Magazine of Exotic Botany* 1: t. 25 (Knowles & Wescott 1837). – **Type**: PERU – **Lima Region** • *J. Dombey s.n.*; lectotype: P [P00482218], designated by Smith & Wasshausen (1979: 243).

**Etymology**

The species' epithet refers to the number of tepals on the staminate flower. While the number varies from 6 to 11 in this species, eight is probably the most common number of tepals.

**Selected specimens examined**

PERU • 1778–1788; *H.A. Ruiz & J.A. Pavón s.n.*; MA [MA813503]. – **Piura Region: Prov. Ayabaca** • Cerro Chacas; [4°36′ S, 79°41′ W]; 27 Apr. 2006; *M.F. Sandoval 67*; HUT • Dist. Ayabaca, Las Lomas to Ayabaca road, between Pingola & Chinchinpampa; 4°40′ S, 79°46′ W; 2539 m a.s.l.; 28 May 2015; *M.C. Tebbitt & A. Daza 842*; E, MOL • Ruinas de Aypate, comunidad campesina de Tacalpo, anexo Yanachala; 4°42.94′ S, 79°34.252′ W; 2800–2850 m a.s.l.; *O. Angulo Z. & R. Yahuana R. 604*; HUT. – **Prov. Huancabamba** • Carretera entre Canchaque y Huancabamba, km del 16 al 25 desde Canchaque; [5°22′ S, 79°36′ W]; 1900–2200 m a.s.l.; 17 Apr. 1987; *C. Díaz &. S. Baldeón M. 2419[a]*;

MO [MO-098230] • [Dist. Huarmaca], Cerca Abra de Porculla, entre Olmos y Jaén; [5°50′ S, 79°31′ W]; 2000–2100 m a.s.l.; 22 Apr. 1964; *R. Ferreyra 15664*; MO [MO-2218589], USM • [Dist. Huarmaca], km 40–41 hwy from Olmos to Jaén; 5°52′11″ S, 79°31′38″ W; 1925 m a.s.l.; 3 Feb. 1997; *W.H. Lewis, R. Castro, G. Yarupaid N. & N. Malca 17352*; MO [MO-2264010]. – **Cajamarca Region: Prov. Chota** • Entre Huambas y Llama (Quiribamba); [6°31′ S, 79°05′ W]; 2500 m a.s.l.; 19 Jun. 1980; *J. Cabanillas J. 82*; CPUN • Llama-Huambas; [6°27′ S, 79°00′ W]; 2100 m a.s.l.; 22 May 1965; *A. López & A. Sagástegui A. 5276*; HUT, US [US00222213] • ibid.; 6°27′00″ S, 79°00′36″ W; 2475 m a.s.l.; 25 Jul. 2014; *P.W. Moonlight & A. Daza 70*; E [E00983197], MOL. – **Prov. Santa Cruz** • Dist. Pulan, Languden; [6°44′ S, 78°53′ W]; 2600 m a.s.l.; 31 Apr. 2006; *I. Santa Cruz 407*; USM. – **Prov. Cajamarca** • entre Malete y Tambo, Hacienda Pauca; [6°52′ S, 78°16′ W]; 3100 m a.s.l.; 18 May 1973; *I. Sánchez V. 1161*; CPUN • El Bosque, Hacienda Campodén; [7°31′ S, 78°30′ W]; 2430 m a.s.l.; 12 May 1953; *M. Vargas & A. Novoa 2219*; HUT, US [US00222220]. – **Prov. San Miguel** • Dist. La Florida, above La Florida; 6°53′26″ S, 79°03′13″ W; 1787 m a.s.l.; 30 May 2015; *M.C. Tebbitt & A. Daza 848*; E, MOL • Entre San Juan y Huacraruco; [7°18′ S, 78°28′ W]; 2500 m a.s.l.; 8 May 1986; *I. Sánchez V. 4066*; CPUN, MO [MO-2218579]. – **Prov. Contumazá** • Way from Cruz Grande to La Henrilla; 7°22′02.4″ S, 78°53′30.9″ W; 3350 m a.s.l.; 24 Apr. 2001; *T. Henning & C. Schneider 28*; HUT, USM • Entrada al Bosque Cachil; [7°24′ S, 78°47′ W]; 2500 m a.s.l.; 9 Jul. 1993; *A. Sagástegui A., S. Leiva & P. Lezama 14965*; MO [MO-2218587] • Lledén-San Martín; [7°26′ S, 78°44′ W]; 2500 m a.s.l.; 31 May 1988; *A. Sagástegui A., E. García & S. Leiva 14020*; MO [MO-1642405], US [US00424981]. – **Lambayeque Region: Prov. Chiclayo** • Dist. Reque, Cerro Reque; 6°52′30.68″ S, 79°45′58.93″ W; 574 m a.s.l.; 5 Oct. 2013; *A. Juarez 703*; USM. – **La Libertad Region: Prov. Bolívar** • Dist. Uchumarca, Arriba de Uchumarca, 75 km entre Balsas y Bolívar; 7°03′12″ S, 77°49′15″ W; 3527 m a.s.l.; 5 Feb. 2020; *P. Gonzáles, Z.A. Goodwin, J.L. Marcelo-Peña & I. Sachahuamán 5808*; USM • Quilcaypirca, camino Longotea-Bolívar; [7°04′ S, 77°50′ W]; 3300 m a.s.l.; 2 Jun. 1960; *A. López M. & A. Sagástegui 3352*; USM. – **Prov. Gran Chimú** • Dist. Cascas, road between Cascas and Cotumazá, directly below Bosque de Cachil; 7°25′ S, 78°47′ W; 2316 m a.s.l.; *M.C. Tebbitt & A. Daza 828*; E, MOL. – **Prov. Otuzco** • El Granero, Hacienda Llaguén; [7°43′ S, 78°43′ W]; 2900 m a.s.l.; Jun. 1951; *A. López M. 4728*; HUT • Parva Grande, Sinsicap; [7°51′ S, 78°46′ W]; 2780 m a.s.l.; 1 May 1954; *A. López, M. Várgas & C. Hererra 2284*; HUT • Abajo de Shitahuara; [7°59′ S, 78°37′ W]; 11 Jun. 1992; *S. Leiva G. & P. Leiva G. 583*; US [US00511224]. – **Ancash Region: Prov. Rucuay** • Marco; [10°11′ S, 77°28′ W]; 2650 m a.s.l.; 1 Apr. 1994; *P. Gamarra 418*; USM. – **Prov. Bolognesi** • Usgor abajo de Chiquián; [10°09′ S, 77°09′ W]; 3200–3300 m a.s.l.; 19 May 1950; *R. Ferreyra 7569*; MO [MO-2218580], US [US00222223], USM • Alrededores de Chiquián (Ninan); [10°09′ S, 77°09′ W]; 3250 m a.s.l.; [10°13′ S, 77°38′ W]; 12 May 1960; *E. Cerrate de Ferreyra 3104*; USM • Cerro arriba de la Rinconada, camino a Ocros; [10°25′ S, 77°25′ W]; 2900 m a.s.l.; 2 May 1977; *E. Cerrate, K. Mejía & B. Millán 6641*; USM. – **Huánuco Region: Prov. Huánuco** • Between Carpish and Chinchao; [9°43′ S, 76°06′ W]; 3000–3100 m a.s.l.; 5 Apr. 1948; *C.M. Ochoa 422*; US [US00222221] • Cani Pueblo 7 miles NE of Mito; [9°54′ S, 76°23′ W]; 16–26 Apr. 1923; *J.F. MacBride 3739*; USM • 15 miles SE of Huánuco; 10°10′ S, 76°11′ W; 31 May–3 Jun. 1922; *J.F. MacBride & Featherstone 2129*; F. – **Lima Region: Prov. Chanchay** • Naupay; [11°14′ S, 76°56′ W]; 2700 m a.s.l.; 22 Mar. 1975; *E. Cerrate de Ferreyra V., M. Chanco, G. Vilcapoma & M.A. Ferreyra 6322*; USM • Lomas de Lachay cerca a Chancay; [11°21′ S, 77°22′ W]; 12 Oct. 1946; *R. Ferreyra 201*; USM • Lomas de Lachay; 300–500 m a.s.l.; [11°22′ S, 77°21′ W]; *L. Bernardi 16399*; G. – **Prov. Huaral** • Iguanil; [11°24′ S, 77°14′ W]; 400 m a.s.l.; 4 Oct. 1987; *E. Cerrate de Ferreyra 9154*; USM • Lomas de Chancayllo; [11°27′ S, 77°18′ W]; 250–300 m a.s.l.; 20 Nov. 1965; *R. Ferreyra 16607*; MO [MO-2218578], USM. – **Prov. Canta** • Rumpuy cerca a Magua (Huascoy); [11°17′ S, 76°46′ W]; 2500–2800 m a.s.l.; 28 Mar. 1959; *C. Acleto 27*; USM • San Buenaventura; [11°29′ S, 76°40′ W]; 2700–2900 m a.s.l.; 17 Jun. 1925; *F.W. Pennell 14531*; GH • Arahuay; [11°37′ S, 76°40′ W]; 2600 m a.s.l.; 4 Apr. 1975; *C.M. Ochoa & G. Vilcapoma 268*; USM. – **Prov. Huarochirí** • Arriba de Surco entre Chosica y San Mateo; [11°47′ S, 77°18′ W]; 3000 m a.s.l.; 1 May 1948; *R. Ferreyra 3447*; GH, USM • Mountains of Zarate, San Bartolome; [11°51′ S, 76°31′ W]; ca 3000 m a.s.l.; 29 May 1959; *L.K. Diels*

1137 (US [US00222215] • Huaquicha arriba de Surco; 2800 m a.s.l.; [11°54′ S, 76°25′ W]; 9 Mar. 1974; *E. Cerrate de Ferreyra 5786*; USM). – **Prov. Lima** • Amancay, 5 km southeast of Lima; [11°59′ S, 77°01′ W]; 300 m a.s.l.; 24 Sep. 1938; *H.E. Stork & C.B. Horton 9269*; G, GH, K, MO, UC • Quebrada (loma) de Manzano, trail to Cerro Manzano, E of Pachacamac; [12°12′ S, 76°54′ W]; 300–500 m a.s.l.; *S. Knapp, J. Mallet, H. Clark, C. Díaz, B. León & K. Young 8341*; F [V0078824F], MO, NY • ca 6 km E of Pachamac; [12°13′ S, 76°47′ W]; 500–700 m a.s.l.; 19 Jul. 1953; *S.G.E. Saunders 193*; BM, MO. – **Prov. Yauyos** • Yauyos; [12°27′ S, 75°55′ W]; *H. Beltrán 74*; USM. – **Prov. Cañete** • Lomas de Quilmaná entre Lima y Cañete; [12°55′ S, 76°26′ W]; 570 m a.s.l.; 30 Aug. 1948; *R. Ferreyra 4004*; USM. – **Junín Region: Prov. Concepción** • Dist. Comas, road from Comas to Satipo; 11°29′10″ S, 74°53′12″ W; 3394 m a.s.l.; 13 Feb. 2016; *P.W. Moonlight & A. Daza 229*; E [E00885596], G, MOL • ibid., km 99; 11°38′03″ S, 74°59′16″ W; 3573 m a.s.l.; 13 Feb. 2016; *P.W. Moonlight & A. Daza 227*; E [E00885592], MO, MOL • Road Huancayo-Llanta; 12°00′48.8″ S, 74°54′71.5″ W; 3550 m a.s.l.; *R.T. Pennington, A. Daza & J.L. Marcelo 1486*; E [E00933639], MOL. – **Huancavelica Region: Prov. Tayacaja** • Alrededores de Salcabamba; [12°11′ S, 74°47′ W]; 3000–3100 m a.s.l.; Apr. 1962; *O. Tovar 3600*; US [US00222217], USM. – **Ayacucho Region: Prov. La Mar** • Road from Tambo to Ayna, above Jano; [12°47′ S, 73°59′ W]; 2895 m a.s.l., 3 Jan. 1975; *T. Plowman & E.W. Davis 4667*; USM. – **Apurimac Region: Prov. Abancay** • Bosques bajos Nacchero; [13°16′ S, 72°50′ W]; 2950 m a.s.l.; 14 Jan. 1950; *J.C. Vargas Calderón 8961*[a]; CUZ.

**Description**

Acaulescent, rhizomatous herb, to 50 cm high. *Rhizome* ellipsoid, 2–5 × 1–2 cm, with 1 growing point. *Stipules* persistent, triangular, 6–10 × 3–10 mm, apex obtuse, opaque, red to brown, glabrous, margin entire, aciliate to sparsely ciliate. *Leaves* > 3, alternate, basifixed; petiole 7–45 cm long, green to red, sparsely to densely lanate; blade subsymmetric, circular to triangular in outline, to 25 × 27 cm, succulent, apex indistinct to obtuse, base cordate, basal lobes not overlapping or overlapping, sinus to 80 mm deep, margin with 0–10 short, crenate lobes on the broad side of the lamina, dentate, ciliate, upper surface green, sometimes flushed deep purple around the petiole insertion, glabrous to pilose, lower surface pale green, sometimes flushed deep purple around the petiole insertion and major veins, glabrous to sparsely lanate, sparsely to densely lanate on the major veins, veins palmate but with 1 primary vein, 5–6 veined from the base, with 1–3 secondary vein on the larger side, 1–3 on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, a dichasial or monochasial cyme, with 1–3 branches, bearing up to 3 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 50 cm long, red, sparsely to densely lanate, bracts persistent, ovate to lanceolate, 5–11 × 2–8 mm, opaque, white, green, or red, glabrous, apex acute to obtuse, margin entire, aciliate. *Staminate flowers*: pedicels to 55 mm long, sparsely to densely lanate; tepals 6–11, spreading, oblanceolate to obovate, 10–30 × 6–17 mm, apex rounded, white to pink, glabrous, rarely sparsely lanate on the outer surface, margin entire, aciliate; stamens 50–100, spreading, yellow, filaments 2–5 mm long, free, anthers obovoid, ca 0.5–1 × 0.5 mm, dehiscing via lateral slits, connectives extended to ca 0.1 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 58 mm long; bracteoles lacking to 2, positioned directly beneath the ovary, lanceolate to ovate, ca 5 × 3–4 mm, apex acute to rounded, opaque, green flushed red, glabrous, margin entire, aciliate; tepals 6–10, subequal, late deciduous in fruit, spreading, elliptic to oblanceolate, 11–24 × 4–9 mm, apex rounded to truncate, white to pink, glabrous on the inner surface, sparsely to densely lanate on the outer surface, margin entire, aciliate; ovary body ovoid to broadly obovoid, 8–10 × 5–12 mm, white to pink, sparsely to densely lanate, unequally 3-winged, the largest triangular to rectangular, 8–10 × 8–25 mm, the smallest a semi-circular ridge, 0.5–4 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 3–5 mm long, > 5 times-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 55 mm long. *Fruit body* obovoid, to 10 × 12 mm, drying brown, wings same shape as in ovary, the largest expanding to 12 × 35 mm, the smallest not expanding.

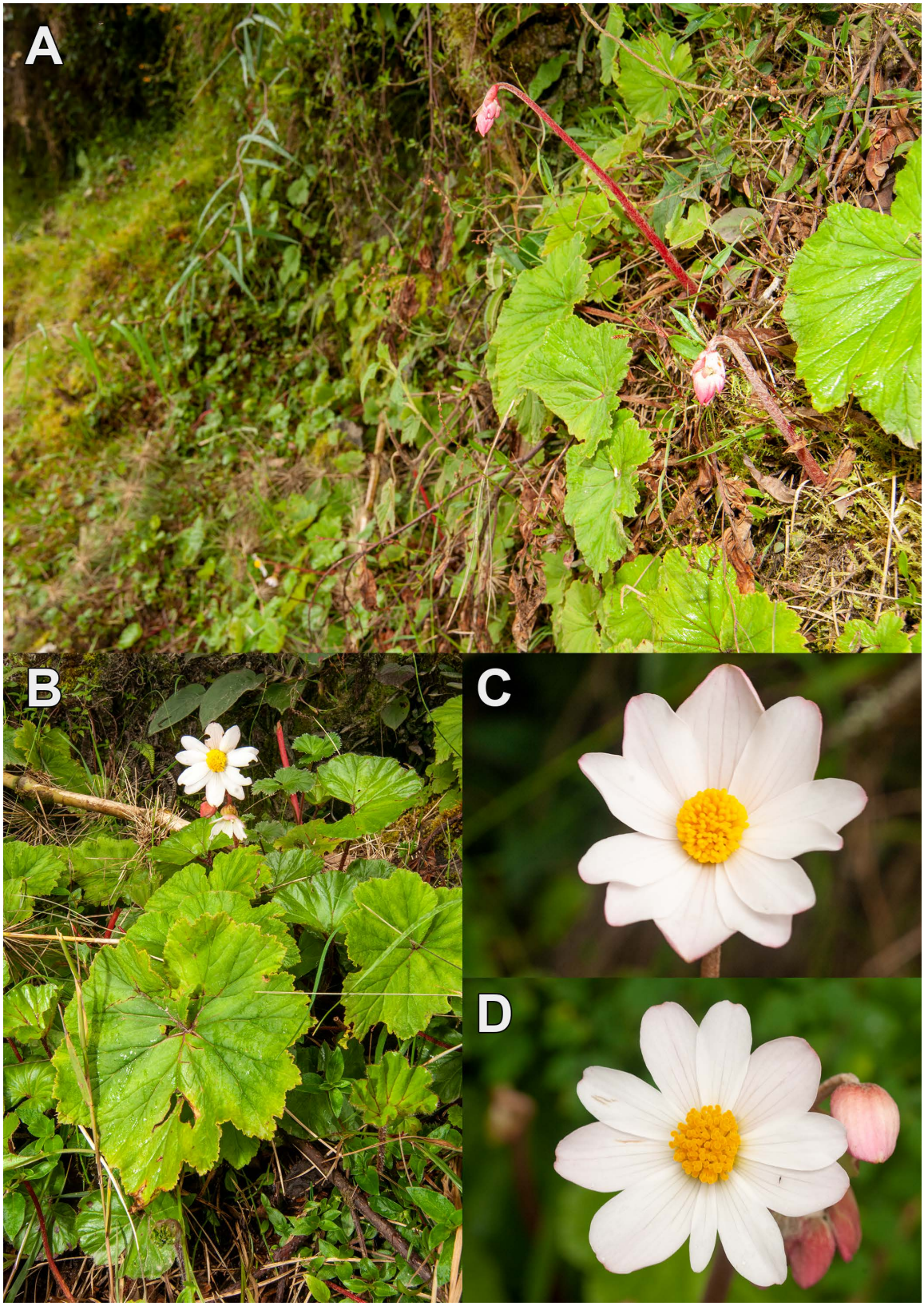


**Fig. 54.** *Begonia octopetala* L'Hér subsp. *octopetala*. **A**. Habitat. **B**. Habit. **C**. Staminate flower, front view. **D**. Pistillate flower, front view. All photographs taken by P.W. Moonlight from *P.W. Moonlight & A. Daza 227* (A, B) and *229* (C, D) in Concepción Province, Junín Region.

**Proposed conservation assessment**

Extremely widespread in Peru and Ecuador and in Peru occurs both in the Andes and coastal Lomas. The species is extremely common in Lomas formations, particularly around Lima, which have been subject to urban expansion over the past 50 years but are now protected. In the Andes, *B. octopetala* subsp. *octopetala* has a much more scattered distribution and often occurs in small populations (e.g., surrounding single waterfalls) but can also occur over relatively large areas with > 10 000 individuals in a single population (e.g., over the Huancabamba Pass in Piura Region and on the road from Comas to Satipo in Junín Region). We assess *B. octopetala* subsp. *octopetala* as Least Concern (LC).

**Synonymy notes**

We clarify here that *B. grandiflora* Knowles & Wescott is a superfluous name. It was published in 1837 based upon living material descended from seeds collected by J. Dombey in 1778 and grown in Paris before being sent to the authors (Knowles & Wescott 1837). The name *B. grandiflora* was used by Ruiz, Pavon, and Dombey on their expedition and it seems likely they intended to publish the species under this name (MA-AJB04-D-1388). In 1788 however, Charles Louis L'Héritier de Brutelle published the species as *B. octopetala* based upon Dombey's material (L'Héritier de Brutelle 1788). Knowles & Wescott cited L'Héritier's work and stated they believed their *B. grandiflora* was the same species as *B. octopetala* (Knowles & Wescott 1837). Following Article 52.2(e) (Turland *et al.* 2018), *B. grandiflora* is therefore a superfluous name of *B. octopetala*.

**Typification notes**

The protologue of *B. octopetala* cited material collected in Peru by Dombey, but did not cite a herbarium. Smith & Wasshausen (1979) cited a duplicate of this collection in Paris herbarium as the type, which is an effective lectotypification.

*Begonia grandiflora* is a superfluous name for *B. octopetala* and no type was indicated in the protologue. Following Article 7.5 (Turland *et al.* 2018), the type of this name is therefore the same as for *B. octopetala*.

**Identification notes**

*Begonia octopetala* subsp. *octopetala* is the most common geophytic species of *Begonia* in coastal Peru and the central and northern Andes. Care should be taken to ensure potential specimens of this species do not have strongly asymmetric inflorescences (*B. pleiopetala* and *B. pseudopleiopetala* Tebbitt); uniformly red tepals (*B. polypetala*); < 6 tepals on the staminate flower (*B. geraniifolia*, *B. joshii, B. speculum*, *B. tumbezensis* and *B. weberbaueri*); staminate flowers with tepals with emarginate apices (*B. anemoniflora*) or serrate margins (*B. tumbezensis*); bifid styles (*B. joshii*, *B. speculum* and *B. weberbaueri*); or ascending fruit wings (*B. octopetala* subsp. *ovatiformis* Irmsch.).

**Distribution and ecology**

Found in Peru and Ecuador. Within Peru, collected in Piura, Cajamarca, Lambayeque, La Libertad, Ancash, Huánuco, Lima, Huancavelica, Ayacucho, and Apurimac Regions (Fig. 52B). Known from an elevation of 0–3527 m a.s.l., which is uniquely broad for a *Begonia*, and found within Lomas formations, dry forest and scrubland, northwest Peruvian montane forest, high elevation grasslands, and rarely middle and upper montane Forest. *Begonia octopetala* subsp. *octopetala* is a geophytic herb and is dormant in the dry season, flowering at the start of the dry season. Throughout its range, the wet season varies such that *B. octopetala* subsp. *octopetala* has been collected in flower in every month of the year.

36.2 ***Begonia octopetala*** subsp. ***ovatiformis*** Irmsch.
Fig. 52B

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 75 (Irmscher 1953). – **Type**: PERU – **[Huánuco Region: Prov. Huánuco]** • Estacion near Muña; ca 1980 m a.s.l.; [9°40′ S, 75°49′ W]; 20 May–1 Jun. 1923; *J.E. Macbride 4143*; holotype: F [V0042326F, photo K].
Brako & Zarucchi (1993: 194); León & Monsalve (2006: 167); Tebbitt (2015: 484).

### Etymology

Irmscher (1953) distinguished this variety from other members of the species primarily by its ovate leaf blades. The epithet refers to this characteristic.

### Specimen examined

PERU – **Huánuco Region: Prov. Huánuco** • Clefts of rocks near Muña; [9°40′ S, 75°49′ W]; 2745–3050 m a.s.l.; May 1863, *coll. unknown 185*; K.

### Description

Acaulescent, rhizomatous herb, to 45 cm high. *Rhizome* ellipsoid, ca 3.5 × 2 cm, with 1 growing point. *Stipules* persistent, triangular, ca 9 × 9 mm, apex obtuse, opaque, brown, glabrous, margin entire, aciliate to sparsely ciliate. *Leaves* 1–3, alternate, basifixed; petiole 14–17 cm long, colour unknown, lanate; blade subsymmetric, triangular in outline, to 21 × 15.5 cm, succulent, apex obtuse, base cordate, basal lobes not overlapping or overlapping, sinus to 50 mm deep, margin with 0–5 short, crenate lobes on both sides of the lamina, dentate, ciliate, upper surface green, pilose, lower surface pale green, glabrous to sparsely pilose, veins palmate but with 1 primary vein, 5–6 veined from the base, with 1–3 secondary veins on the larger side, 1–3 on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, a dichasial or monochasial cyme, with 1–3 branches, bearing up to 3 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 45 cm long, red, sparsely to densely lanate, bracts persistent, ovate to lanceolate, 5–11 × 2–8 mm, opaque, white, green, or red, glabrous to lanate, apex acute to obtuse, margin entire, aciliate. *Staminate flowers*: pedicels to 3 cm long, sparsely to densely lanate; tepals 6, spreading, oblanceolate to obovate, 17–22 × 7–17 mm, apex rounded, white to pink, glabrous, margin entire, aciliate; stamens 50–75, spreading, yellow, filaments 2–3 mm long, free, anthers obovoid, ca 1 × 0.5 mm, dehiscing via lateral slits, connectives extended to ca 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 9 cm long; bracteoles unknown or lacking; tepals ca 7, subequal, late deciduous in fruit, spreading, obovate, 7–17 × 7–13 mm, apex rounded to truncate, white to pink, glabrous on the inner surface, sparsely to densely lanate on the outer surface, margin entire, aciliate; ovary body ovoid to broadly obovoid, 6–13 × 5–13 mm, white to pink, densely lanate, unequally 3-winged, the largest rectangular, ascending, 7–13 × 7–25 mm, the smallest a semi-circular ridge, 0.5–1 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 3–4 mm long, > 5 times-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 9 cm long. *Fruit body* obovoid, to 13 × 13 mm, drying brown, wings same shape as in ovary, the largest expanding to 13 × 50 mm, the smallest not expanding.

### Proposed conservation assessment

Previously assessed by León & Monsalve (2006) as Data Deficient (DD). Known from a single population but not collected for < 100 years, though this area is poorly collected. We have been unable to visit this locality so assess *B. octopetala* var. *ovatiformis* as Data Deficient (DD).

**Notes**

The taxonomic status of this subspecies is unclear. It is known from two specimens, which share some characteristics with *B. octopetala* and others with *B. aequatorialis* Irmsch. The types of these two species differ substantially: the type of *B. octopetala* has broadly ovate leaves that lack a distinct apex; subsymmetric inflorescences; staminate flowers with > 6 tepals; > 1.5 cm broad tepals on the staminate flowers; and ascending largest fruit wings. In contrast, the type of *B. aequatorialis* has much smaller, deltoid leaves with a distinct apex; asymmetric inflorescences; staminate flowers with 6 tepals; < 1.5 cm broad tepals on the staminate flowers; and non-ascending largest fruit wings. Irmscher's concept of *B. octopetala* subsp. *ovatiformis* is intermediate between these two species. It differs from the type of *B. octopetala* in having deltoid leaf laminae with a clear apex; six tepals on the staminate flower; and ascending largest fruit wings but differs from the type of *B. aequatorialis* in having subsymmetric inflorescences and broader tepals on the staminate flowers. The boundaries between the three taxa have become blurred due to the recent collection of several collections of *B. octopetala* from the Andean cordillera. These specimens tend to have smaller, more triangular shaped leaves (e.g., *P.W. Moonlight & A. Daza 106*) and narrower tepals on the staminate flower (e.g., *P.W. Moonlight & A. Daza 229*) than the type of *B. octopetala* but remain distinct from the type of *B. octopetala* subsp. *ovatiformis* in their non-ascending fruit wings.

Mark Tebbitt is currently undertaking a full taxonomic revision of *B.* sect. *Eupetalum* (Tebbitt in prep.) following his recent revision of the closely related *B.* sect. *Australes* (Tebbitt 2020). We suspect the boundaries of these species may change as a result of this revision but maintain *B. octopetala* subsp. *ovatiformis* as a distinct taxon in this treatment.

**Identification notes**

Distinct from most specimens of *B. octopetala* in its leaf laminae, which are deltoid in outline (vs circular to rarely deltoid), and its staminate flowers, which have 6 (vs 6–11 tepals). The only character that can distinguish this subspecies reliably is its ascending (vs non-ascending) fruit and ovary wings.

**Distribution and ecology**

Endemic to Peru and Huánuco Region (Fig. 52B). Known from 1980–3050 m a.s.l. in elevation in middle and upper montane forest. Like the type subspecies, *B. octopetala* var. *ovatiformis* is tuberous and likely dies down to its tuber in the dry season.

### 37. ***Begonia pleiopetala*** A.DC.
Figs 3B, 4C, 6F, 7G, 52C, 55

*Annales des Sciences Naturelles Botanique, Série 4* 11: 121 (de Candolle 1859). – **Type**: PERU • Andibus; *J. McLean s.n.*; holotype: K [K000252037].

Smith & Schubert (1941a: 197, 1944: 83); Brako & Zarucchi (1993: 195); Vásquez *et al.* (2005: 112–125); Wasshausen *et al.* (2014: 386); Tebbitt (2015: 484).

*Begonia gracillima* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 120 (de Candolle 1859). – **Type**: PERU • 1839–1840; *C. Gay s.n.*; lectotype: P [P00482219], designated by Tebbitt (2015: 484); isolectotype: G-DC ex P.

de Candolle (1864: 283); Smith & Schubert (1941a: 191); Brako & Zarucchi (1993: 192); León & Monsalve (2006: 166); Tebbitt (2015: 484).

*Begonia pusilla* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 120 (de Candolle 1859). – **Type**: BOLIVIA – **Prov. Yungas** • Dec. 1846; *H.A. Weddell 4215*; lectotype: G-DC ex P [F neg. 7327], designated by Tebbitt (2015: 484); isolectotypes: P [P00482207, F neg. 38530].

Smith & Schubert (1944: 83); de Candolle (1864: 282); Tebbitt (2015: 484).

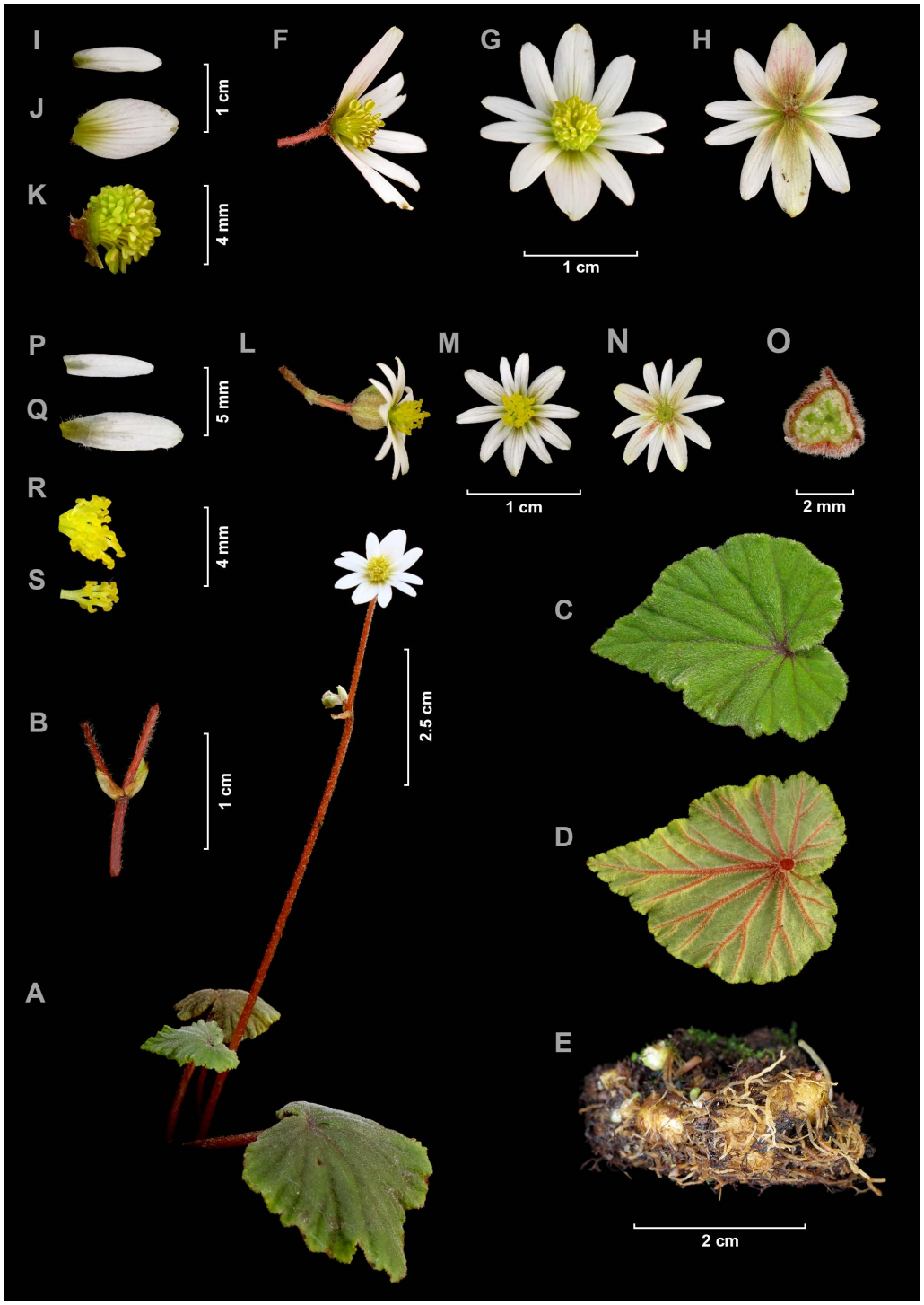


**Fig. 55.** *Begonia pleiopetala* A.DC. **A**. Habit. **B**. Section of inflorescence and bracts. **C**. Leaf, adaxial surface. **D**. Leaf, abaxial surface. **E**. Tuber. **F**. Staminate flower, side view. **G**. Staminate flower, front view. **H**. Staminate flower, back view. **I**. Smallest tepal of staminate flower. **J**. Largest tepal of staminate flower. **K**. Androecium, side view. **L**. Pistillate flower, side view. **M**. Pistillate flower, front view. **N**. Pistillate flower, back view. **O**. Cross section of ovary. **P**. Smallest tepal of pistillate flower. **Q**. Largest tepal of pistillate flower. **R**. Pistils, side view. **S**. Pistil, side view. All photographs taken by D.A. Purvis in the living collections of the Royal Botanic Garden Edinburgh (Accession 20160140, grown from seeds collected as part of *P.W. Moonlight & A. Daza 236*).

*Begonia tenuicaulis* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 120 (de Candolle 1859). – **Type**: BOLIVIA – **Prov. Larecaja** • Caupolican, valées entre Tipoani et Apolobamba; May 1847; *H.A. Weddell 4592*; lectotype: P [P00482211, F neg. 38533], designated by Tebbitt (2015: 484); isolectotype: G-DC ex P.

de Candolle (1864: 282); Tebbitt (2015: 484).

*Begonia warburgiana* Hieron., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 21: 325 (Hieronymus 1895). – **Type**: BOLIVIA – **[La Paz Department]** • Illimani, entre Pongo y Apacheta; 3800 m a.s.l.; 17 Dec. 1876; *A. Stübel 24b*; lectotype: B [B100186583, F neg. 20908], designated by Smith & Schubert (1944: 84).

Smith & Schubert (1944: 84); Tebbitt (2015: 484).

### Etymology

In common with other members of *B.* sect. *Eupetalum*, the staminate flowers of *B. pleiopetala* have more tepals than usual in the genus. The epithet derives from the Greek '*pleiōn*' and '*petalos*', meaning 'more' and 'petals'.

### Selected specimens examined

PERU – **La Libertad Region: Prov. Pataz** • Chigualen, above los Alisos; [7°46′ S, 77°33′ W]; 21 Feb. 1986; *K. Young 2892*; HUT • Chigualen; [7°47′ S, 77°43′ W]; 21 Feb. 1986; *K. Young 2878*; HUT. – **Ancash Region: Prov. Huaylas** • Huascarán National Park Quebrada Parón; 9°01′ S, 77°03′ W; 3500–3760 m a.s.l.; *D.N. Smith 10585*; USM. – **Huánuco Region: Prov. Pachitea** • Dist. Umari. Comunidad campesina de San Marcos; 9°54′11″ S, 76°06′30″ W; 3040 m a.s.l.; 4 Mar. 2010; *H. Beltrán & L. Puelles 6762*; USM. – **Pasco Region: Prov. Oxapampa** • Dist. Pozuzo, Parque Nacional Yanachaga-Chemillén, Estación Biológica Huampal, Quebrada Honda; 10°10′59.5″ S, 75°34′37.7″ W, 1021 m a.s.l.; 29 Mar. 2017; *A. Orejuela & J. Castillo 2914*; USM • Dist. Oxapampa, Estación Biológica Huampa, Parque Nacional Yanachaga-Chemillén, camino a colones; 10°11'42.32"S, 75°35′16.8″ W; 1056 m a.s.l.; 27 Apr. 2012, *R. Rojas, K. Durand, G. Shareva & R. Zehnder 8000*; HOXA, USM • Road from Oxapampa to Pozuzo; 1131 m a.s.l.; 10°11′14″ S, 75°54′37″ W; 1131 m a.s.l.; 21 Feb. 2016; *P.W. Moonlight & A. Daza 297*; E [E00885875], MO, MOL • **Junín Region**: **Prov. Tarma**: Dist. Huasahuasi, camino hacia el centro poblado de San Lorenzo de Ninabamba; 10°58′25.8″ S, 75°29′05.4″ W; 2000 m a.s.l.; 16 Mar. 2017; *L. Valenzuela, J. Flores & S. Riva 31731*; USM • Santuario Nacional de Pampa Hermosa; 10°59′ S, 75°25′ W; 1400–1900 m a.s.l.; *S. Riva, L. Valenzuela & J. Flores 135*; USM. – **Prov. Chanchamayo** • Agua Blanca Canyon trail from Puente Azúcar; ca 100 m on to trail, 10°11′32″ S, 75°27′18″ W; 1431 m a.s.l.; 16 Feb. 2016; *P.W. Moonlight & A. Daza 257*; E [E00885473], MO, MOL. – **Prov. Concepción** • Dist. Comas, road from Comas to Satipo; 11°29′43″ S, 75°52′05″ W; 3097 m a.s.l.; 13 Feb. 2016; *P.W. Moonlight & A. Daza 230*; E [E00180311], MO, MOL • ibid., km 158; 11°29′28″ S, 74°48′16″ W; 1955 m a.s.l.; 13 Feb. 2016l; *P.W. Moonlight & A. Daza 236*; E [E00885475], MO, MOL. – **Huancavelica Region: Prov. Tayacaja** • Montepungo road, east of Surcubamba; [12°07′ S, 74°37′ W]; 2700 m a.s.l.; 13 Jan. 1939; *H.E. Stork & O.B. Horton 10376*; G, K. – **Cusco Region: Prov. Urubamba** • Dist. Ollantaytapata, Garrapatal, Pajonal; 13°04′57″ S, 72°16'57′ W; 3382 m a.s.l.; 25 Feb. 2006; *L. Valenzuela, J. Farfán, E. Suclli, I. Huamantupa & R. Ayerbe 6364*; K, MO [MO-2183895], US [US00951221], USM • Arriba de Machu Picchu Pueblo, Aguas Calientes, por los rieles del tren que conducen a Ollantaytambo, orilla del río Urubamba; 13°10′28.8″ S, 72°31′37.3″ W; 2078 m a.s.l.; 20 Mar. 2017; *A. Orejuela & J. Castillo 2884*; E [E01007465], USM • Dist. Machu Picchu, Wiñay Wayna; 13°13'40′ S, 72°30′23″ W; 2700–3923 m a.s.l.; 21 Feb. 2003; *L. Valenzuela, E. Suclli, I. Huamantupa & A. Carazas 1472*; MO [MO-346339]. – **Prov. La Convención** • Dist. Huayopata, San Luis; 13°04′43″ S, 72°23′25″ W; 2900 m a.s.l.; 22 Mar. 2003; *G. Calatayud, I. Huamantupa, E. Suclli, J. Farfán, A. Carazas & Y. Vizcardo 1319*; MO [MO-300883] • Dist. Huayopata, along 28b between Santa Maria and Ollantaytambo; 13°05′ S, 72°22′ W; 3392 m a.s.l.; 7 Feb. 2015; *M.C. Tebbitt & A. Daza 803*; E

[E01059315], USM • Dist. Huayopata, Abra de Málaga; 13°08′20″ S, 72°18′16″ W; 3700 m a.s.l.; 3 Dec. 2003; *L. Valenzuela, E. Suclli, E. Acurio & R. Bonino 2418*; MO [MO-1664174], US [US00900534]. – **Ayacucho Region: Prov. Chincheros** • Cangallo, 2 km past Ocros on road to Ayacucho; [13°22′ S, 73°47′ W]; 18 Apr. 1971; *J.G. Hawkes 5231*; C. – **Puno Region: Prov. Sandia** • Limbani; [14°09′ S, 69°41′ W]; 3200 m a.s.l.; 22 Nov. 1938; *J.C. Vargas Calderón 1317*; MO [MO-1641355] • SW corner of río Awi-Awi and río Cuyo-Cuyo; 14°08′ S, 69°32′ W; 3250 m a.s.l.; 31 Jan. 1986; *B. Bennett 2073*; NY [NY01149161] • Dist. Cuyocuyo, between Cuyocuyo and Sandia; 15°26′ S, 69°33′ W; 3789 m a.s.l.; *M.C. Tebbitt & A. Daza 813*; E [E01059314], MOL, USM.

### Description

Acaulescent, tuberous herb, to 25 cm high. *Tuber* spheroid, 1–4 × 1–4 cm, with 1 growing point. *Stipules* persistent, triangular, 2–5 × 2–4 mm, apex acute, opaque, dark brown, glabrous, margin entire, aciliate. *Leaves* 2–8, alternate, basifixed; petiole 1–12.5 cm long, red, sparsely to densely tomentose; blade subsymmetric, reniform to ovate, to 15 × 11 cm, succulent, apex indistinct, rounded, to obtuse, base truncate to cordate, basal lobes overlapping or not overlapping, sinus to 25 mm deep, margin undulate, crenate, or dentate, aciliate to ciliate, upper surface green, glabrous to pilose or villous, lower surface very pale green with red veins, glabrous to sparsely pilose on the lamina, sparsely to densely pilose or villous on the veins, veins palmate, 5–8 veined from the base. *Inflorescences* 1–4, bisexual, axillary, erect, a dichasial or monochasial cyme, with 2 branches, bearing up to 2 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 21 cm long, white to green or red, sparsely tomentose, bracts late deciduous, lanceolate, 4–10 × 1–5 mm, translucent, pale green, glabrous, sparsely tomentose on the outside, apex acute, margin entire, sometimes serrulate at the apex, aciliate to ciliate. *Staminate flowers*: pedicels to 45 mm long, sparsely tomentose; tepals 5–11, projecting, lanceolate, 5–25 × 1–13 mm, apex rounded, white to pink, rarely red, glabrous, sometimes lanate on the outside, margin entire, aciliate; stamens 15–50, spreading, yellow, filaments 0.5–2.5 mm long, free, anthers ellipsoid, 1–1.5 × 0.5–0.8 mm, dehiscing via lateral slits, connectives not extending or extending to 0.75 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 55 mm long; bracteoles lacking; tepals (4–)5–10, subequal, persistent in fruit, spreading, elliptic to ovate, 4–10 × 1–10 mm, apex rounded to truncate, white to pink, rarely red, glabrous, sparsely tomentose outside, margin entire, aciliate; ovary body ovoid, 2–8 × 2–7 mm, white to green or red, sparsely to densely tomentose, unequally 3-winged, rarely 2-winged, the largest wing triangular to rectangular, sometimes ascending, 2–8 × 2–10 mm, the smallest marginal, 0.5–1 mm wide; 3-locular, rarely 2-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, rarely 2, yellow, free, 2–4 mm long, 2- to 4-lobed, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 55 mm long. *Fruit body* ovoid, to 9 × 8 mm, drying brown, wings same shape as in ovary, the largest expanding to 9 × 14 mm, the smallest expanding to 1.5 mm wide.

### Proposed conservation assessment

Recently assessed as Least Concern (LC) by Tebbitt (2016).

### Notes

The specimen *C. Díaz 2481*[a] is *B. pleiopetala* but the label data describes a locality in lowland Amazonian forest in Loreto Region that is unsuitable for this species. We include the specimen *H. Beltrán & L. Puelles 6762* in this species, though it differs from all other specimens in its larger, red flowers. It may represent an undescribed species, but the material is insufficient for description.

### Typification notes

Tebbitt (2015) attempted to designate the specimen *A. Stübel 24B* as the lectotype of *B. warburgiana* Hieron. However, Smith & Schubert (1944) has already cited this specimen as the type of the name, which is an effective lectotypification. Tebbitt's lectotypification was superfluous.

### Identification notes

A variable species that differs greatly in its size, the thickness of its leaves, and its indumentum across its elevational range. Most similar to *B. octopetala* but with fewer stamens (< 50 vs > 50) and usually a much smaller plant with smaller flowers and narrower tepals, though the two species overlap fully in these characters.

### Distribution and ecology

Known from Peru and Bolivia. Within Peru, known from La Libertad, Ancash, Huánuco, Pasco, Junín, Huancavelica, Cuzco, Apurimac, and Puno Regions (Fig. 52C). Found in lower, middle, and upper montane forest and high elevation grasslands at an elevation of 946–3950 m a.s.l. In the lower parts of its elevational range, *B. pleiopetala* is typically found on cliff faces and at higher elevations it is found among rocks and growing on grassy slopes. The species is a geophyte and dies down to its tuber in the dry season. The species flowers in the wet season, which is mostly from December to March.

## 38. ***Begonia polypetala*** A.DC.

Figs 52D, 56

*The Garden* 14: 531 (de Candolle 1878). – **Type**: PERU • Cultivated, Jardin de M.M. Froebel, Zurich, Switzerland, Zurich, Switzerland; 1878; *M.M. Froebel s.n.*; lectotype: G [F neg. 24202], **designated here**.

Smith & Schubert (1941a: 198); Brako & Zarucchi (1993: 194); León & Monsalve (2006: 168); Tebbitt (2015: 480).

### Etymology

Named for the unusually high number of tepals in the staminate flowers of the species, which is a common feature of the octopetala group of *B.* sect. *Eupetalum*.

### Specimens examined

PERU • Nov. 1912; *E.F. André K1069*; K. – **Piura Region: Prov. Huancabamba** • Entre Palambla y Turmalina, ruta a Huancabamba; 5°00′25″ S, 79°48′11″ W; 3100 m a.s.l.; 30 Apr. 1988; *I. Sánchez V. 5122*; CPUN, F • Dist. Canchaque; [5°22′ S, 79°35′ W]; 3 Jun. 1961; *C. Acleto 225*; USM • Carretera entre Canchaque y Huancabamba, km del 16 al 25 desde Canchaque; [5°22′ S, 79°35′ W]; 17 Apr. 1987; *C. Díaz y S. Baldeón M. 2403*; F, MO [MO-098013], USM • ibid.; 21 Mar. 1989; *C. Díaz y H. Beltrán 3390*; MO [MO-098012], USM • Arriba de Canchaque, cerca al puente; [5°22′ S, 79°35′ W]; 1800–2000 m a.s.l.; 22 Mar. 1948; *R. Ferreyra 3117*; MO [MO-2218585], US [US00222147], USM • Above Canchanque on the Huancabamba pass; 5°22′02″ S, 79°34′33″ W; 2028 m a.s.l.; 27 Jan. 2016; *P.W. Moonlight & A. Daza 113*; E [E00885472], MO], MOL • ibid.; 5°22′39″ S, 79°33′32″ W; 2371 m a.s.l.; 27 Jan. 2016; *P.W. Moonlight & A. Daza 119*; E [E00885469], MO [MO-3254813], MOL • Dist. Canchaque, between Canchaque and Huancabamba; 5°22′ S, 79°34′43″ W; 1848–2063 m a.s.l.; 27 May 2015; *M.C. Tebbitt & A. Daza 839*; E, MOL • Dist. Canchaque, Paso Cuello del Inio; [5°52′ S, 79°32′ W]; *C.M. Ochoa 1796*; CAS. – **Cultivated** • Jardin de M.M. Froebel, Zurich, Switzerland; Oct. 1877; *M.M. Froebel s.n.*; G.

### Description

Acaulescent, tuberous herb, to 35 cm high. *Tuber* ellipsoid, 2–10 × 2.5 cm, with 1 growing points. *Stipules* persistent, broadly triangular, 5–10 × 5–12 mm, apex acute, opaque, dark brown, glabrous, margin entire, aciliate. *Leaves* 1–3, alternate, basifixed; petiole 6–27 cm long, pale green, densely hirsute; blade subsymmetric, ovate, to 36 × 26 cm, succulent, apex acuminate, base cordate, basal lobes

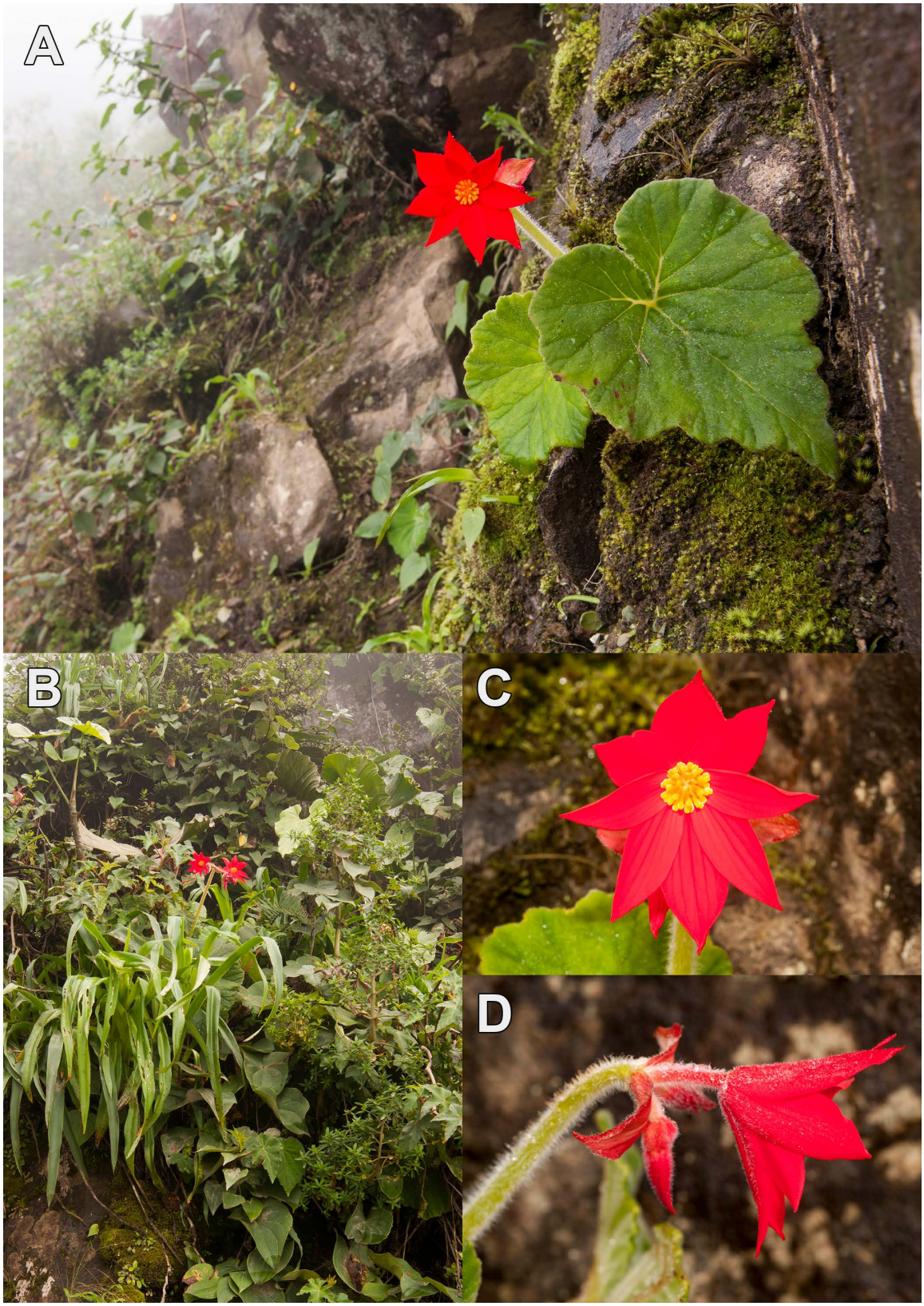


**Fig. 56.** *Begonia polypetala* A.DC. **A**. Habit. **B**. Habitat. **C**. Staminate flower, front view. **D**. Staminate flower and inflorescence, side view. All photographs by P.W. Moonlight from *P.W. Moonlight & A. Daza 119* in Huancabamba Province, Piura Region.

not overlapping or overlapping, sinus to 7 mm deep, margin irregularly serrate, rarely with 1–5 triangular lobes on each side of the blade (*W. Lewis et al. 17352*), ciliate, upper surface pale green, pilose, lower surface very pale green, densely hirsute on the vein, pilose on the lamina, veins palmate but with one major vein, 5–8 veined from the base, with 2–4 secondary veins on the larger side, 2–4 secondary veins on the smaller side. *Inflorescence* 1, bisexual, axillary, erect, cymose, with up to 8 branches, bearing up to 4 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 28 cm long, pale green, sparsely to densely hispid, bracts persistent, ovate, 12–24 × 4–10 mm, opaque, red, sparsely to densely hispid, apex acute to truncate, margin lacerate, ciliate. *Staminate flowers*: pedicels to 4.5 mm long, densely villous; tepals 6–8, projecting, subequal, 17–45 × 6–14 mm, apex acute, vivid red, glabrous to sparsely pilose on the outer surface, margin entire, aciliate; stamens ca 40, projecting, yellow, filaments 2–5 mm long, fused into an irregularly branching column, anthers ellipsoid, 1–2 × 0.5 mm, dehiscing via lateral slits, connectives not extending, symmetrically basifixed. *Pistillate flowers*: pedicels to 45 mm long; bracteoles lacking; tepals 5, subequal, persistent in fruit, projecting, 20–32 × 4–9 mm, apex acute, vivid red, glabrous to densely hirsute, margin entire, aciliate; ovary body ovoid, 8–10 × 4–7 mm, red, densely villous, unequally 3-winged, the largest wing triangular, 8–10 × 3–5 mm, the smallest marginal 1–2 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 7.5 mm long, irregularly 2- to 4-lobed, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 62 mm long. *Fruit body* broadly ovoid, to 10.5 × 13.5 mm, drying brown, wings same shape as in ovary, the largest expanding to 10.5 × 13.5 mm, the smallest not expanding.

**Proposed conservation assessment**

Assessed as Critically Endangered (CR B1ab(iii)) by León & Monsalve (2006) because it was only known from a single locality and is rarely collected. Fieldwork in 2016 demonstrated the species is common at the type locality (ca 2500 individuals) and frequent collections from this locality suggest the population is stable. The species has now also been collected from a population further north (*I. Sánchez V. 5122*), extending the known EOO of *B. polypetala* to > 100 km$^2$. We assess *B. polypetala* as Endangered (EN B1ab(iii)).

**Typification notes**

The protologue of *B. polypetala* included a description and diagnosis written by A.P. de Candolle from cultivated material sent to Geneva by Mr Otto Froebel of Zurich (de Candolle 1878: 531). The protologue includes an illustration of a staminate inflorescence, which is not sufficient to act as a lectotype. Geneva herbarium includes two sheets that could argued represent original material and are therefore candidates to act as lectotypes. The specimen is dated from October 1877 and includes a label written by A.P. de Candolle which can be translated as "not one of the species of the Prodromus", which demonstrates that this was considered an undescribed species by de Candolle. This specimen is accompanied by a letter from Froebel, dated 22$^{nd}$ Oct. 1877, describing the specimen, its origins, and asking for an identification. The second specimen is labelled as "*Begonia polypetala* A.DC." and is accompanied by two letters, which are of a little more impatient tone. By the time of the last letter, Frobel had visited Kew herbarium where he was unable to find any material matching his plant. Frobel also implies that he had sent "several" letters to de Candolle over the years requesting an identification. The label of the second specimen has the following written in de Candolle's handwriting: "J'ai envoyé à Mr Froebel une description qu'il compte publier dans *The Garden*. Originaire du Pérou. Sept. Jardin de MM. Frobel à Zurich, Nov. 1878". This implies de Candolle used this specimen to prepare his description of *B. polypetala*. The description of *B. polypetala* was published on the 14$^{th}$ of December edition of *The Garden*, which implies an impressive turnaround between de Candolle describing the species and it appearing in print. This second specimen was photographed by the Field Museum (#24202) and has therefore been treated as the de facto type of *B. polypetala*. Accordingly, we designate this sheet as the lectotype of *B. polypetala* herein.

### Identification notes

When in flower, identifying *B. polypetala* is straightforward as it is the only tuberous species of *Begonia* from Peru with red tepals or with acute apices. Identifying sterile individuals is more difficult, but the species' indumentum of white, reflective hairs and leaves with acuminate apices are diagnostic.

### Distribution and ecology

Endemic to Peru and Piura Region (Fig. 52D). Found in northwest Peruvian relict montane forests at an elevation of 1850–3100 m a.s.l. *Begonia polypetala* is fully deciduous and survives the dry season as a tuber. The flowers are produced during the wet season, which is from February to April. The species' red flowers suggest it is pollinated by hummingbirds, but it provides no nectar reward and no such observations have been made. Much of the precipitation in the species' range is condensation from clouds and the dense hairs on the species' leaves and stems may help it trap this moisture.

## 39. ***Begonia pseudopleiopetala*** Tebbitt

Fig. 52C

*Novon* 23 (4): 486 (Tebbitt 2015). – **Type**: PERU – **Cajamarca Region: Contumazá** • ca 20 km S of Contumazá, ca 18jm above Cascas; 7°25′ S, 78°25′ W; 2160–2200 m a.s.l.; 14 Apr. 1986; *M.O. Dillon, D. Dillon & A. Sagástegui A. 4528*; holotype: F [V0360785F]; isotypes: GB [GB0058014], US [US00431510].

### Etymology

This species is easily confused with *B. pleiopetala* and the epithet reflects this.

### Selected specimens examined

PERU – **Piura Region: Prov. Huancabamba** • Canchaque; [5°22′ S, 79°36′ W]; 1300–1500 m a.s.l.; 22 Mar. 1948; *R. Ferreyra 3134*; USM. – **Cajamarca Region: Prov. Contumazá** • Santiago Guzmango; [7°22′ S, 78°54′ W]; 2100 m a.s.l.; 6 May 1965; *A. Sagástegui A. & M. Fukushima 5070*; HUT, US [US00222211] • El Túnel, Cascas-Contumazá; [7°24′ S, 78°48′ W]; 2700 m a.s.l.; 6 Apr. 1985; *A. Sagástegui A., M. Guzmán, S. Leiva G. & C. Tellez A. 12629*; HUT • Bosque Cachil; [7°26′ S, 78°49′ W]; 2500 m a.s.l.; 16 Jun. 1994; *A. Sagástegui A., S. Leiva G. & P. Lezama 15405*; NY. – **La Libertad Region: Prov. Gran Chimú** • Cascas-Contumazá; [7°25′ S, 78°47′ W]; 2250 m a.s.l.; 19 May 1962; *A. López, A. Sagástegui A. & I. Sánchez 3678*; HUT • Dist. Cascas, road between Cascas and Contumazá; 7°25′33″ S, 78°47′07″ W; 2007 m a.s.l.; 23 May 2015; *M.C. Tebbitt & A. Daza 826*; E, MOL.

### Description

Acaulescent, tuberous herb, to 40 cm high. *Tuber* ellipsoid, 0.8–1.3 × 0.5 cm, with 1 growing point. *Stipules* persistent, triangular, 2–3 × 1.5–2 mm, apex acuminate, aristate, opaque, brown, glabrous, margin entire, aciliate. *Leaves* 1–5, alternate, basifixed; petiole 3.5–11(–50) cm long, pale pink, glabrous to densely pubescent; blade sub-symmetric, ovate, to 6 × 6.5 cm, succulent, apex acuminate, base cordate, basal lobes not overlapping, sinus to 15 mm deep, margin denticulate to dentate, glabrous to ciliate, upper surface green, sparsely to densely pilose, lower surface pale green, glabrous, pubescent on the major veins, veins palmate with one major vein, 5–6 veined from the base, with 1–3 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1 per plant, bisexual, axillary, erect, a dichasial or monochasial cyme, with up to 3 branches, bearing up to 3 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 65 cm long, pink, sparsely to densely pubescent, bracts persistent, elliptic to ovate, 2.5–11 × 1.5–8 mm, opaque, pink, glabrous, pubescent beneath, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 40 mm long, sparsely to densely pubescent;

tepals 7–8, spreading, obovate to elliptic, 13–19 × 5–11 mm, apex obtuse to rounded, white, glabrous, outer surfaces sparsely pubescent, margin entire, aciliate; stamens ca 100, spreading, yellow, filaments 1.5–3 mm long, fused at the base, anthers obovate, ca 1 × 0.5 mm long, dehiscing via lateral slits, connectives extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 32 mm long; bracteoles lacking; tepals 5, subequal, persistent in fruit, spreading, ovate to obovate, 8–17 × 2–7 mm, apex obtuse to rounded, white, glabrous, margin entire, aciliate; ovary body obovoid, 3–8 × 2–7 mm, pale green to pink, pubescent, unequally 3-winged, largest wing rectangular, 8–15 × 5–11 mm, smallest rib-like, 1–3 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 4–6 mm long, irregularly 3 to 5 times-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 35 mm long. *Fruit body* obovoid, to 8 × 7 mm, drying brown, wings same shape as in ovary, the largest expanding to 17 × 10 mm, the smallest expanding to 3 mm wide.

**Proposed conservation assessment**

Assessed by Tebbitt (2015) as Data Deficient (DD).

**Notes**

Tebbitt (2015) described *B. pseudopleiopetala* to encompass specimens from Piura, Cajamarca and La Libertad Regions that superficially resembled *B. pleiopetala* but with several consistent differences. *Begonia pseudopleiopetala* had acuminate (vs rounded to acute) leaf apices; obovate (vs elliptic to oblong) anthers lacking extended connectives; and 5 tepals on the pistillate flowers (vs 7–9). We have since collected several specimens of *B. pleiopetala* from central Peru (Pasco and Junín Regions) that share several of these characteristics. All were collected from < 2000 m a.s.l. in elevation on seasonally wet cliffs in lower and middle montane forest rather than the species usual high elevation grassland habitat. These specimens variously have acuminate leaf apices (*P.W. Moonlight & A. Daza 236*, *257*); anthers lacking extended connectives (*P.W. Moonlight & A. Daza 236*, *257*); as few as 4 tepals on the pistillate flower (*P.W. Moonlight & A. Daza 295*, *297*); and other unusual characters including two-locular ovaries (*P.W. Moonlight & A. Daza 295*, *297*); but no individual has more than two of these characters. These characters may be the result of stress in marginal habitats, but limited evidence suggests this is not the case. Seed collected from the collection *P.W. Moonlight & A. Daza 236* grown at the Royal Botanic Gardens Edinburgh retained the acuminate leaf apices and anthers lacking extended connectives of its parent plant (see Fig. 55), suggesting these characters are not simply a response to atypical growing conditions in the wild. None of these specimens have all four of the characteristics used by Tebbitt to separate *B. pseudopleiopetala* from *B. pleiopetala* so we retain it as a different species but suggest further genetic and morphological work may be required to determine whether they should be retained as separate species.

**Identification notes**

*Begonia pseudopleiopetala* differs from *B. pleiopetala* in its leaves with an acuminate apex (vs rounded to acute and rarely acuminate), its pistillate flowers with five tepals (vs [5–]7–9 tepals), and its obovate (vs elliptic to oblong) anthers with non-extended (vs non-extended to extended) connectives. Some specimens of *B. pleiopetala* share one or rarely two of these characters (see Notes) but no known specimens share all four characters.

**Distribution and ecology**

Endemic to Peru and known from Piura, Cajamarca, and La Libertad Regions (Fig. 52C). Found within northwest Peruvian relict montane forest at elevations from 1300–2500 m a.s.l. *Begonia pseudopleiopetala* is a geophytic species and dies down to its tuber in the dry season. It flowers during the wet season in March to June.

40. ***Begonia tumbezensis*** Irmsch.
Fig. 52A

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 74 (Irmscher 1953). – **Type**: PERU – **Tumbes Region: [Prov. Contralmirante Villar]** • Mountains S.E. of Hacienda la Choza; [4°10′ S, 80°47′ W]; 900–1000 m a.s.l.; *A. Weberbauer 7685*; lectotype: F [V0042335F, photo P, illustration B [B100186585]], **designated here**; epitype: US [US00222324], **designated here**; isolectotype: B ex F [B100186589] • Tumbes Region, mountains S.E. of Hacienda Chicama; [4°10′ S, 80°47′ W]; 800–900 m a.s.l.; 19–24 Feb. 1927; *A. Weberbauer 7646*; syntypes: F [V0042334F, V0042333F], B ex F [B100186588].
Brako & Zarucchi (1993: 195); León & Monsalve (2006: 169); Tebbitt (2015: 480).

### Etymology

The type collection was made by Augusto Weberbauer in Tumbes Region, and the species is named for its type locality.

### Selected specimens examined

PERU – **Tumbes Region: Prov. Tumbes** • East of Hacienda Chicama; [4°10′ S, 80°47′ W]; *A. Weberbauer 7641*; B. – **Cajamarca Region: Prov. Contumazá** • Entre Chilete y El Rupe, al oeste de la carretera Chilete-Contumazá; [7°18′ S, 78°49′ W]; 1700 m a.s.l.; 19 Feb. 1987; *I. Sánchez V. 4230*; CPUN, MO [MO-2218588]. – **La Libertad Region: Prov. Trujillo** • Cerro Campana, ca 16 km N of Trujillo on Pan-American highway; [7°59′ S, 79°06′ W]; 300–700 m a.s.l.; 10 Oct. 1986; *M.O. Dillon, J. Santisteban & B. León 4660*; F [2: V0078830F, V0078831F], HUT • Cerro Chiputur; [8°10′ S, 78°57′ W]; 400–500 m a.s.l.; 25 Jul. 1948; *N. Angulo 829*; HUT • Virú; [8°19′ S, 78°48′ W]; 525 m a.s.l.; 3 Sep. 1949; *N. Angulo 1102*; HUT • ibid.; 420 m a.s.l.; 18 Aug. 1949; *N. Angulo 1113*; HUT.

### Description

Acaulescent, tuberous herb, to 35 cm high. *Tuber* globose, 1.5–2.5 × 1.5–2 cm, with 1 growing point. *Stipules* persistent, triangular, 5–8 × 4–6 mm, apex acute, opaque, dark brown, glabrous, margin entire, aciliate. *Leaves* 2–5, alternate, basifixed; petiole 4.5–35 cm long, green, sparsely to densely villous; blade subsymmetric, reniform, to 21 × 21.5 cm, succulent, apex indistinct and rounded to obtuse or short-acuminate, base cordate, basal lobes overlapping or not overlapping, sinus to 8 cm deep, margin serrate, often with 2 to 5 triangular lobes, ciliate, upper surface green, glabrous, lower surface green, densely villous to glabrous, veins palmate, 4–8 veined from the base. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with 4 branches, bearing up to 4 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 35 cm long, sparsely to densely villous, bracts persistent, ovate, 8–12 × 4–6 mm, opaque, white, glabrous, apex obtuse, margin entire, aciliate. *Staminate flowers*: pedicels to 4.5 cm long, sparsely villous; tepals 4, spreading, outer 2 broadly-ovate, 10–25 × 12–32 mm, apex rounded, white, sometimes flushed pink at the apex, glabrous, margin entire to serrate towards the apex, ciliate, inner 2 ovate to obovate, 8–24 × 6–21 mm, apex rounded, white, glabrous, margin entire to rarely serrate towards the apex, aciliate; stamens > 50, spreading, yellow, filaments 3–5 mm long, free, anthers ovoid, 0.5–0.8 × 0.3 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 30 mm long; bracteoles lacking; tepals 5, subequal, persistent in fruit, spreading, the largest ovate, 10–13 × 6–10 mm, apex rounded, white, sometimes flushed pink at the apex, glabrous, margin entire to serrate, aciliate, the smallest ovate, 9–10 × 4–6 mm, apex rounded, white, glabrous, margin entire, aciliate; ovary body obovoid, 7–12 × 6–13 mm, glabrous, unequally 3-winged, largest wing rectangular, ca 15 × 8 mm, smallest wings marginal 1–2 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 3–4.5 mm long, > 3 times-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 30 mm long. *Fruit body*

obovoid, to 10 × 15 mm, drying brown, largest wings same shape as in ovary, expanding to 20 × 35 mm, the smallest expanding to a triangular wing, to 13 × 11 mm.

**Proposed conservation assessment**

Assessed by León & Monsalve (2006) as Data Deficient (DD). Now known from an EOO of almost 40 000 km$^2$, which includes the well-protected Cerro Campana in Trujillo Region and the Cerros de Amotape National Park in Tumbes Region, as well as protected areas in Ecuador. We assess *B. tumbezensis* as Least Concern (LC).

**Typification notes**

The protologue of *B. tumbezensis* cited material of two collections held in Chicago (F): *A. Weberbauer 7646* and *7685* (Irmscher 1953: 74). Irmscher also sketched both specimens and removed material, which he deposited in Berlin herbarium. It is appropriate to choose a lectotype from the material of these two collections held in F. The best candidate of these specimens is *A. Weberbauer 7685* (V0042335F) because it includes developing fruits, and we designate this specimen as the lectotype. Unfortunately, Irmscher removed all staminate flowers from this sheet and characters of the staminate flowers are key for identifying *B. tumbezensis*. It is therefore appropriate to designate an epitype. A duplicate of the lectotype held at US herbarium (US00222324) is the ideal candidate because it includes staminate flowers, pistillate flowers and fruits so we assign this sheet as the epitype of *B. tumbezensis*. This also ensures all the type material of *B. tumbezensis* is derived from a single gathering.

**Identification notes**

Most collections of *B. tumbezensis* have been incorrectly named as *B. octopetala*. The two species are trivial to distinguish in flower due to the number of tepals on the staminate flower (4 tepals in unequal pairs in *B. tumbezensis*; at least 6 subequal tepals in *B. octopetala*) and the serrated outer tepals of the staminate flowers of *B. tumbezensis* (vs entire).

**Distribution and ecology**

Known from Peru and Ecuador. Within Peru, collected within La Libertad, Cajamarca, and Tumbes Regions (Fig. 52A). It is found most frequently in Lomas formations surrounding Trujillo, but also in dry forests and scrubland in Cajamarca and Tumbes Regions. All these areas have a distinct dry season and *B. tumbezensis* dies back to a tuber during the dry season and flowers in the wet season, which is July to October in Lomas formations and from February in Dry Forests.

***Begonia*** sect. ***Gobenia*** A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 133 (de Candolle 1859). – **Type**: lectotype: *Begonia maurandiae* A.DC., designated by Barkley & Baranov (1972: 4).

**Notes**

This is a morphologically homogeneous and monophyletic section of herbaceous vines found from central Peru to Colombia (Doorenbos *et al.* 1998; Moonlight *et al.* 2018; Tebbitt & Pérez in press). All species are terrestrial climbers or epiphytes that root at the nodes. They also have a series of unusual floral characters, including their short styles with thickened branches, their pistillate flowers with two or four bracteoles, and their unusually showy androecium.

In Peru, *Begonia* sect. *Gobenia* is represented by two species, which are easily identified to section as the only peltate leaved climbers in the country. Our species circumscriptions follow those of an inedited monograph of the section by Mark Tebbitt and Alvaro Peréz (Tebbitt & Pérez in press). While

our circumscription of *B. hitchcockii* differs from previously published circumscriptions (e.g., Smith & Wasshausen 1986), we therefore claim no credit for the taxonomic insights that led to these changes.

### 41. ***Begonia aeranthos*** L.B.Sm. & B.G.Schub.
Fig. 57A

*Memoirs of the New York Botanical Garden* 8 (1): 36 (Smith & Schubert 1952). – **Type**: ECUADOR – **Prov. Santiago-Zamora** • "oriente", Cordillera Cutucú; ca 2°40′ S, 78°W; 1370–1675 m a.s.l.; 17 Nov.–5 Dec. 1944; *W.H. Camp E-1317*; holotype: NY [NY00112289].

Smith & Wasshausen (1979: 239, 1986: 15); Brako & Zarucchi (1993: 191); Vásquez *et al.* (2005: 112–125); Quintana & León-Yáñez (2011: 197); Tebbitt & Pérez (in press).

*Begonia grandibracteolata* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76 (1): 91 (Irmscher 1953). – **Type**: PERU • *W. Lobb s.n.*; holotype: W.

#### Etymology

The name is derived from the Greek words '*aérios*' and '*anthos*' meaning 'aloft' and 'flower'. This refers to the species' epiphytic habit of the species.

#### Specimens examined

PERU – **Huánuco Region** • SW slope of the río Ilulla Pichis watershed, on the ascent of Cerros del Sira, in valley-canyon on the way to waterfall just below camp 4 (Peligroso); 9°25′ S, 74°44′ W; 1500 m a.s.l.; 22 Jul. 1969; *T.R. Dudley 13115*; US [US01925936]. – **Prov. Leoncio Prado** • Dist. Hermillo Valdizán, La Divisora, near top of divide between Huallaya and Aguaytía drainages, border with Loreto; 9°09′56″ S, 75°47′31″ W; 1630 m a.s.l.; 29 Mar. 1977; *A.H. Gentry, D.C. Daly & S. Cruz 18892*; MO [MO-1642606] • ibid.; *A.H. Gentry, D.C. Daly & S. Cruz 18892*[a]; MO [MO-1643492] • ibid.; 1500–1600 m a.s.l.; 21 Jun. 1976; *J. Schunke V. 9321*; F, MO [2: MO-1643515, MO-2154630], US [2: US00672824, US01925934] • ibid.; 9°09′24″ S, 75°47′31″ W; 1500–1600 m a.s.l.; *J. Schunke V. 11435*; MO [MO-2216361]. – **Pasco Region: Prov. Oxapampa** • Dist. Pozuzo, Parque Nacional Yanachaga-Chemillén, Sector Huampal, Microcuenca Quebrada Onda; 10°11′01″ S, 75°39′13″ W; 1172 m a.s.l.; 11 May 2011; *A. Arapa & D. Mateo 4*; HOXA, MO [2: MO-2648700, MO-2648701], USM. – **Ucayali Region: Prov. Coronel Portillo** • Dist. Iparía, falda dento las cuencas del río Ariapo y río Iparía, afluentes del río Ucayali, Reserva Comunal el Sira; 9°27.85"S, 74°33.95"W; 1550–1600 m a.s.l.; 3 Nov. 2009; *J.G. Graham 5213*; MOL, US [US01088860].

#### Description

Caulescent, lianescent herb, to 6 m high. *Stem* repent, branching; internodes to at least 12 cm long, to 3 mm thick, succulent, appearing woody at the base, brown to red, glabrous. *Stipules* persistent, lanceolate to ovate, 6–12 × 2–6 mm, apex acute, opaque, brown, glabrous, margin entire, aciliate. *Leaves* > 5 per stem, alternate, minutely peltate; petiole 4–20 cm long, red, glabrous; blade subsymmetric, elliptic to ovate, to 24 × 11 cm, succulent, apex acuminate, base truncate to rounded, margin denticulate to serrate, ciliate, upper surface green, glabrous, lower surface green, glabrous, veins peltate, 6–7 veined from the base. *Inflorescences* 1–3 per stem, unisexual, axillary, pendulous, cymose, with 5 branches, bearing up to 16 staminate flowers or 16 pistillate flowers; peduncle to 13 cm long, red, glabrous, bracts deciduous, lanceolate, 6–14 × 2–4 mm, opaque, red, glabrous, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 25 mm long, glabrous; tepals 4, projecting, outer 2 oblong to lanceolate, 18–20 × 6–7 mm, truncate, red, glabrous, margin entire, aciliate, inner 2 lanceolate, ca 11 × 5 mm, apex acute, red, glabrous, margin entire, aciliate; stamens 6, projecting, yellow, filaments 0.8–1 mm long, fused into an irregularly branching column to 5 mm long, anthers narrowly ovoid, ca 3 × 1 mm, dehiscing via lateral slits, connectives projecting, symmetrically basifixed. *Pistillate flowers*: pedicels

to 25 mm long; bracteoles 2, positioned directly beneath the ovary, elliptic to ovate, 10–12 × 4–6 mm, apex acute, opaque, red, glabrous, margin entire, aciliate; tepals 5, subequal, late deciduous in fruit, projecting, elliptic, 10–17 × 4–12 mm, apex acute to acuminate, red, glabrous, margin entire, aciliate; ovary body ovoid to globose, 8–12 × 4–12 mm, red, glabrous, unequally 3-winged, largest triangular, ascending, 9–20 × 7–12 mm, smallest rib-like to semi-circular, 9–20 × 2.5–5 mm; 3-locular, placentae unknown; styles 3, yellow, fused at the base, 5–12 mm long, reniform, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 25 mm long. *Fruit body* globose, to 15 × 15 mm, drying brown, wings same shape as in ovary, the largest expanding to 27 × 20 mm, the smallest to 20 × 5 mm.

### Proposed conservation assessment

Assessed by Quintana & León-Yáñez (2011) as Endangered (EN B1ab(iii)). At this point, the species was known only from the type locality where it had not been collected since 1952. We cite specimens from four localities but despite extensive searches in 2016, were unable to locate the species during fieldwork at the two localities we visited. We assess *B. aeranthos* as Endangered (EN B2ab(iv)).

### Identification notes

*Begonia aeranthos* is easily recognised as the only climbing species of Peruvian *Begonia* with peltate leaves with a petiole insertion < ⅕ of the length along the leaf. All Peruvian collections of *B. aeranthos* were previously identified as *B. glabra*, which is a superficially similar but not peltate species. The flowers of these species are very different, with *B. glabra* having relatively small, white flowers and *B. aeranthos* having large, red flowers.

### Distribution and ecology

Known from Ecuador and Peru. Within Peru it has been collected in Huánuco, Pasco, and Ucayali Regions (Fig. 57A). Found in lower montane forest at an elevation of 1170–1600 m a.s.l. where it grows as an epiphyte. Its vivid red, pendulous flowers suggest *B. aeranthos* is pollinated by hummingbirds.

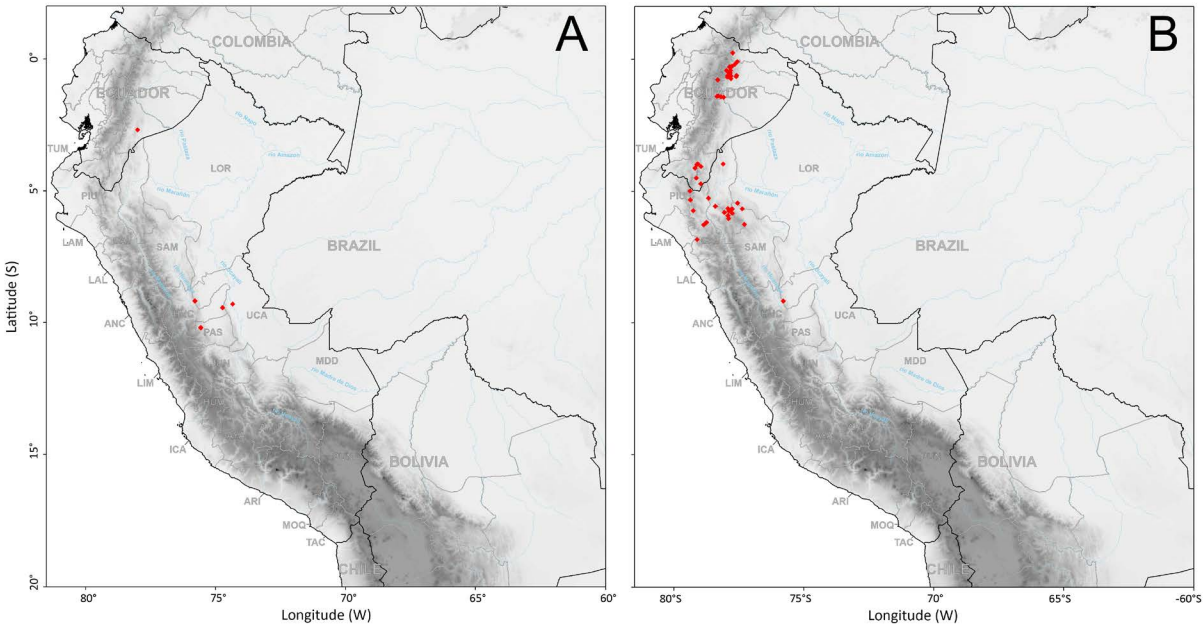


**Fig. 57.** Distribution of *Begonia* sect. *Gobenia* A.DC. in Peru and surrounding countries. **A**. *B. aeranthos* L.B.Sm. & B.G.Schub. (red). **B**. *B. hitchcockii* Irmsch. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

Extensive fieldwork in both the Huánuco and Pasco populations in 2016 failed to locate *B. aeranthos*, which leads us to believe it is either rare or usually an epiphyte in very tall trees.

### 42. ***Begonia hitchcockii*** Irmsch.

Figs 57B, 58

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 620 (Irmscher 1949). – **Type**: ECUADOR • Valley of Pastaza River, between Baños and Cashurco, 8 hours east of Baños; [1°24′ S, 78°21′ W]; 1300–1800 m a.s.l.; 25 Sep. 1923; *A.S. Hitchcock 21800½*; holotype: US [US00115337].

Smith & Wasshausen (1979: 240, 1986: 20); Quintana & León-Yáñez (2011: 199); Tebbitt & Pérez (in press).

*Begonia rubrotincta* L.B.Sm. & B.G.Schub., *Publicaciones del Museo de Historia Natural Javier Prado, Serie B, Botánica* 17 (7): 4 (Smith & Schubert 1964). – **Type**: PERU – **Amazonas Region: Prov. Bongará** • hills west-northwest of Pomacocha; [5°48′ S, 78°03′ W]; 2300–2800 m a.s.l.; 19 Jun. 1962; *J.J. Wurdack 921*; holotype: US [US00115443]; isotypes: A [A00068270], USM [USM000212].

Brako & Zarucchi (1993: 195); León & Monsalve (2006: 168); Tebbitt & Pérez (in press).

*Begonia wurdackii* L.B.Sm. & B.G.Schub., *Publicaciones del Museo de Historia Natural Javier Prado, Serie B, Botánica* 17 (7): 5 (Smith & Schubert 1964). – **Type**: PERU – **Amazonas Regions: Prov. Bongará** • Mossos, 1–5 km S-SE de Yambrasbamba; [5°45′ S, 77°53′ W]; 2100–2400 m a.s.l.; 25 Jun. 1962; *J.J. Wurdack 1028*; holotype: US [US00115499]; isotypes: A [A00068300], US [US00115500], USM [USM000213].

León & Monsalve (2006: 170); Tebbitt & Pérez (in press).

*Begonia pululahuana* auct. non C.DC.: Brako & Zarucchi (1993: 194).

#### Etymology

The type specimen was collected by Albert Spear Hitchcock and the species is named in his honour.

#### Selected specimens examined

PERU – **Amazonas Region: Prov. Utucubamba** • "Nuevo Mundo" trail from Huarango (Cajamarca) to Pisaguas (Amazonas), ca 1hr from crest at divide; 5°15′43″ S, 78°39′05″ W; 1891 m a.s.l.; 28 Jan. 2019; *P.W. Moonlight & A. Daza 123*; E [E00885546], MOL. – **Prov. Bagua** • Cordillera Colán SE of La Peca; [5°34′ S, 78°24′ W]; 1800 m a.s.l.; 17 Oct. 1978; *P.J. Barbour 4119*; MO [MO-1642884], USM [2] • Dist. Yambrasbamba, margen del río Nieva, km 381 del Carretera Marginal; 5°41′ S, 77°47′ W; [2070 m a.s.l.]; 11 Jul. 1999; *I. Sánchez V., G. Iberico & R. Diéguez 10032*; CPUN, F [V0086777F], US [US00673160] • Dist. Cuispes, trail from Cuispes to Catarata Yumbilla, ca 2500 m on to the trail; 5°55′27″ S, 77°54′30″ W; 2223 m a.s.l.; 5 Jul. 2018; *P.W. Moonlight 1272*; USM. – **Prov. Chachapoyas** • past the viewpoint on the trail from Gocta Village to Gocta Falls; 6°01′51″ S, 77°53′36″ W; 2187 m a.s.l.; 2 Jul. 2018; *P.W. Moonlight 1248*; USM. – **Prov. Rodríguez de Mendoza** • Dist. Vista Alegre, Alrededores de Construcciones Chachapoyas, Fundo de Salamón Heredia; 6°15′20.2″ S, 77°16′48″ W; 1871 m a.s.l.; 27 May 2008; *V. Quispuscoa S., L. Cáceres M., I. Treviño Z. & R. Ocampo Z. 4005*; HUT. – **Piura Region: Prov. Huancabamba** • Dist. Carmen de la Frontera, Quebrada Rosarios; 4°59′20″ S, 79°22′24″ W; 2170 m a.s.l.; 22 May 2003; *S. Baldeón M. & F. Neyra J. 5395*; USM. – **Cajamarca Region: Prov. San Ignacio** • road from Sondor to west; 5°19′27″ S, 79°21′31″ W; 2676 m a.s.l.; 27 Jan. 2016; *P.W. Moonlight & A. Daza 121*; E [E00885600], MO [MO-3254809], MOL. – **Prov. Cutervo** • San Andrés de Cutervo, carretera entre San Andrés de Cutervo y Santo Tomás, km 15 a 20; [6°11′ S, 78°44′ W]; *C. Díaz & H. Beltrán 3348*; MO [MO-098015] • Parque Nacional de Cutervo, NW corner of Cordillera Tarros, Chorro Blanco sector, ca 10 km W of San Andrés de Cutervo; 6°12′ S, 78°46′ W; ca


**Fig. 58.** *Begonia hitchcockii* Irmsch. **A**. Habitat. **B**. Habit. **C**. Staminate flower, front view. **D**. Staminate flower, front view. All photographs taken by P.W. Moonlight from *P.W. Moonlight & A. Daza 123* (A, B) and *P.W. Moonlight 1272* (C, D) in Utcubamba and Bagua Provinces, respectively, Amazonas Region.

2600 m a.s.l.; 5 Nov. 1990; *M.O. Dillon, I. Sánchez V. & J. Guevara B. 6191*; CPUN • Road from Santo Domingo de la Capilla to San Pedro; 6°16′12″ S, 78°51′01″ W; 2278 m a.s.l.; 18 Oct. 1998; *R. Castro et al. 19638*; MO [MO-2001146]. – **Prov. Jaén** • "Sallique", quebrada grande, route entre La Cocha y Tablón; [5°44′ S, 79°15′ W]; 2770–2900 m a.s.l.; 30 Jun. 1998; *C. Díaz, J. Campos, T. Guevara & E. Tineo 9783*; HUT, MO [MO-1835219], MOL, US [US00729614]. – **Prov. Santa Cruz** • ca 3.5 km NE of Monteseco; [6°50′ S, 79°06′ W], 2300 m a.s.l.; 20 May 1987; *J. Santisteban & J. Guevara B. 80*; F. – **San Martín Region: Prov. Rioja** • road below pass from Amazonas to San Martín; 5°40′03″ S, 77°44′56″ W; 1739 m a.s.l.; 31 Jan. 2016; *P.W. Moonlight & A. Daza 151*; E [E00885545], MOL • Pedro Ruíz-Moyobamba road, km 390; 5°50′ S, 77°45′ W; 1800 m a.s.l.; 27 Jul. 1983; *D.N. Smith 4428*; F, MO [MO-1641360], US [US00672825]. – **Huánuco Region: Prov. Tingo María** • plantación Margarita cerca a Divisoria; [9°10′ S, 75°47′ W]; 1500–1600 m a.s.l.; 14 Aug. 1946; *R. Ferreyra 1052*; USM.

### Description

Caulescent, lianescent herb, to 10 m high. *Stem* repent, branching, rooting at the nodes; internodes to 5 cm long, to 5 mm thick, succulent, appearing woody at the base, green to red or brown, glabrous. *Stipules* persistent, triangular to ovate, 2–7 × 1.5–5 mm, apex acute, opaque, red to brown, glabrous, margin entire, aciliate. *Leaves* > 10 per stem, alternate, peltate; petiole 1–19 cm long, pale red, glabrous; blade subsymmetric, ovate, to 12 × 7 cm, membranaceous to succulent, apex acuminate, base rounded, margin irregularly serrate, aciliate to ciliate, upper surface green to purple, sometimes with white dots throughout or a red spot at the petiole insertion, glabrous to sparsely pilose, lower surface green, glabrous, veins peltate but with one primary vein, 6–8 veined from the base, with 2–4 secondary on each side. *Inflorescences* many, unisexual, rarely bisexual, axillary, erect, cymose, staminate inflorescence branching up to 4 times, bearing up to 32 flowers, peduncle to 7 cm long; pistillate inflorescence branching up to 4 times, bearing up to 16 flowers, peduncle to 2 cm long, pale green, glabrous, bracts persistent, elliptic to ovate, 3–8 × 2–5 mm, opaque, pale green to brown, glabrous, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 22 mm long, puberulent; tepals 4, spreading, outer 2 ovate, 7–20 × 5–23 mm, apex obtuse, white to red, glabrous, margin entire, aciliate, inner 2 ovate, 6–24 × 3–9 mm, apex obtuse, pink to red, glabrous, margin entire, aciliate; stamens 25–75, spreading, yellow, filaments 2–3 mm long, fused into a column, anthers obovoid, 1–1.5 × 0.5–1 mm long, dehiscing via lateral slits, connectives not extending or extending to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 3 cm long; bracteoles 2–4, positioned at the base of the ovary, elliptic to orbicular, 4–6 × 4–5 mm, apex obtuse, translucent, pale green, glabrous, margin entire, aciliate; tepals 6–7, subequal, persistent in fruit, spreading, ovate, 4–6.5 × 2–5 mm, apex obtuse, white to red, glabrous, margin entire, aciliate; ovary body ellipsoid, 5 × 2–3 mm, white to green, glabrous, unequally 4-winged, largest wing triangular, 3–9 × 5–7 mm, smallest rib-like, ca 0.5 mm wide; 4-locular, placentae branches entire to divided, bearing ovules on both surfaces; styles 4, pale yellow, fused at the base, ca 0.5 mm long reniform, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 30 mm long. *Fruit body* ovoid to globose, to 7 × 7 mm, drying brown, wings same shape as in ovary, not expanding.

### Proposed conservation assessment

Previously assessed as Endangered (EN B1ab(iii)) by Quintana & León-Yáñez (2011). The new circumscription provided by Tebbitt & Pérez (in press) is widespread and locally common in the Ecuadorian and northern Peruvian Andes and has an EOO of > 18 000 km$^2$, encompassing several protected areas. We assess *B. hitchcockii* as Least Concern (LC), which replaces the previous assessments of *B. rubrotincta* as Data Deficient by León & Monsalve (2006).

### Identification notes

The two Peruvian members of *B.* sect. *Gobenia*, *B. hitchcockii* and *B. aeranthos*, are easily recognised as the only lianescent species in Peru with peltate leaves. *Begonia hitchcockii* can be easily distinguished

from *B. aeranthos* by the position of its petiole insertion, which is > ¼ along the length of the leaf in *B. hitchcockii* and < ⅕ along the length of leaf in *B. aeranthos*.

### Distribution and ecology

Known from Ecuador and Peru and within Peru is known from Amazonas, Piura, Cajamarca, San Martín, and Huánuco Regions (Fig. 57B). Found within lower, middle, upper and northwest Peruvian relict montane forest at an elevation of 1500–2900 m a.s.l. in common with other members of *B.* sect. *Gobenia*, *B. hitchcockii* grows as a slender, scrambling herb until reaching a suitable tree trunk or rock to climb. The mature form is lianescent and reaches at least 10 m in length with stems that appear woody. The species is locally common but rarely seen in flower or fruit as it only flowers in the canopy of montane forests or at forest edges.

## ***Begonia*** sect. ***Hydristyles*** A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 132 (de Candolle 1859). – **Type**: lectotype: *Begonia bridgesii* A.DC., designated by Barkley & Baranov (1972: 4).

### Synonymy notes

For a full list of sectional synonyms, see Moonlight *et al.* (2018).

### Notes

This section was erected to include species with multifid styles, five tepals on the pistillate flowers, and two tepals on the staminate flowers (de Candolle 1859: 132).

Since the description of several species considered members of *B.* sect. *Ruizopavonia* or *B.* sect. *Cyathocnemis* with multifid styles (see Doorenbos *et al.* 1998; Moonlight & Reynel 2018), the delimitation of this section has become less clear. This lack of clarity is only exacerbated by the fact that almost half of species now included in *B.* sect. *Cyathocnemis* have five tepals on the pistillate flower. Few members of *B.* sect. *Hydristyles* have been included in molecular phylogenies and we suspect its current circumscription will not survive contact with rigorous phylogenetic analysis. The centre of diversity of *B.* sect. *Hydristyles* is Bolivia and only two species reach Peru. Both are newly recorded for Peru herein, but we also newly synonymise Peruvian endemic *B. peltigera* Irmsch. with *B. unilateralis*.

### 43. ***Begonia andina*** Rusby
Figs 59A, 60

*Bulletin of the New York Botanical Garden* 8: 108 (Rusby 1912). – **Type**: BOLIVIA – **[La Paz Department]** • Santa Barbara; [14°44′ S, 68°37′ W]; 1525 m a.s.l.; 30 Aug. 1902; *R.S. Williams 1566*; lectotype: NY [NY00112290], designated by Smith & Schubert (1944: 81); isolectotypes: BM [BM001191441], K [K000322980], US [US00115238].
Smith & Schubert (1944: 81); Wasshausen *et al.* (2014: 383).

### Etymology

Named for the Andes mountains.

### Specimens examined

PERU – **Puno Region: Prov. Sandia** • Between San Juan del Oro and San Ignacio; [14°10′ S, 69°04′ W]; 1200 m a.s.l.; 7 Jun. 1982; *D.C. Wasshausen & A. Salas 1208*; K [K000374267], US [US001286803]).

BOLIVIA – **La Paz Department: Prov. Franz Tamayo** • Parque Nacional Madidi, Moxos, Fuertecillo; 14°35′56″ S, 68°56′01″ W; 1900 m a.s.l.; 9 Nov. 2007; *A. Arujo-Murakami & N. Chapi 4022*; MO. – **Prov. Bautista Saavedra** • Madidi, Paujeyuyo; 15°02′12″ S, 68°27′26″ W; 940 m a.s.l.; 15 Nov. 2003; *A.F. Fuentes, L. Cayola, S. Whitehead, R. Cuevas & R. Cuevas 6151*; LPB.

**Description**

Caulescent herb, to 120 cm high. *Stem* erect, branching; internodes to 11 cm long, to 7 mm thick, succulent, red to brown, densely stellate-tomentose. *Stipules* deciduous, ovate, 9–15 × 2.5–5 mm, apex acuminate, opaque, red, sparsely to densely stellate-tomentose, margin entire, aciliate. *Leaves* > 5 per stem, alternate, basifixed; petiole 1.5–9.5 cm long, red, densely stellate-tomentose; blade asymmetrical, transversely ovate, to 14.5 × 9 cm, succulent, apex short acuminate, base cordate, basal lobes not overlapping, sinus to 25 mm deep, margin entire to undulate, aciliate, upper surface dark green, sparsely stellate-tomentose, lower surface red, densely stellate-tomentose, veins palmate but with one major vein, 4–7 veined from the base, with 1–3 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 4 branches, bearing up to 16 staminate flowers and 16 pistillate flowers, protandrous; peduncle to 9 cm long, red, densely to sparsely stellate-tomentose, bracts deciduous, broadly deltoid, 2.5–8 × 1.5–8 mm, translucent, colour unknown, sparsely stellate-tomentose, apex truncate, margin lacerate, ciliate. *Staminate flowers*: pedicels to 19 mm long, densely stellate-tomentose; tepals 2, spreading, broadly ovate, 8–16 × 6–12 mm, apex rounded, white to pink, glabrous to sparsely stellate-tomentose, margin entire, aciliate; stamens ca 90, spreading, yellow, filaments 0.5–2 mm long, fused at the base into a torus, anthers oblong, 1–1.5 × 0.5 mm, dehiscing via lateral slits, connectives extended to 0.3 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 20 mm long, densely stellate-tomentose; bracteoles 2, positioned directly beneath the ovary, ca 7 × 6 mm, apex obtuse, translucent, colour unknown, glabrous, margin short-lacerate, ciliate; tepals 5, subequal, deciduous in fruit, projecting, lanceolate to ovate, 4.5–8 × 2–4 mm, apex obtuse, white to pink, glabrous to sparsely stellate-tomentose, margin entire to serrulate, aciliate to sparsely

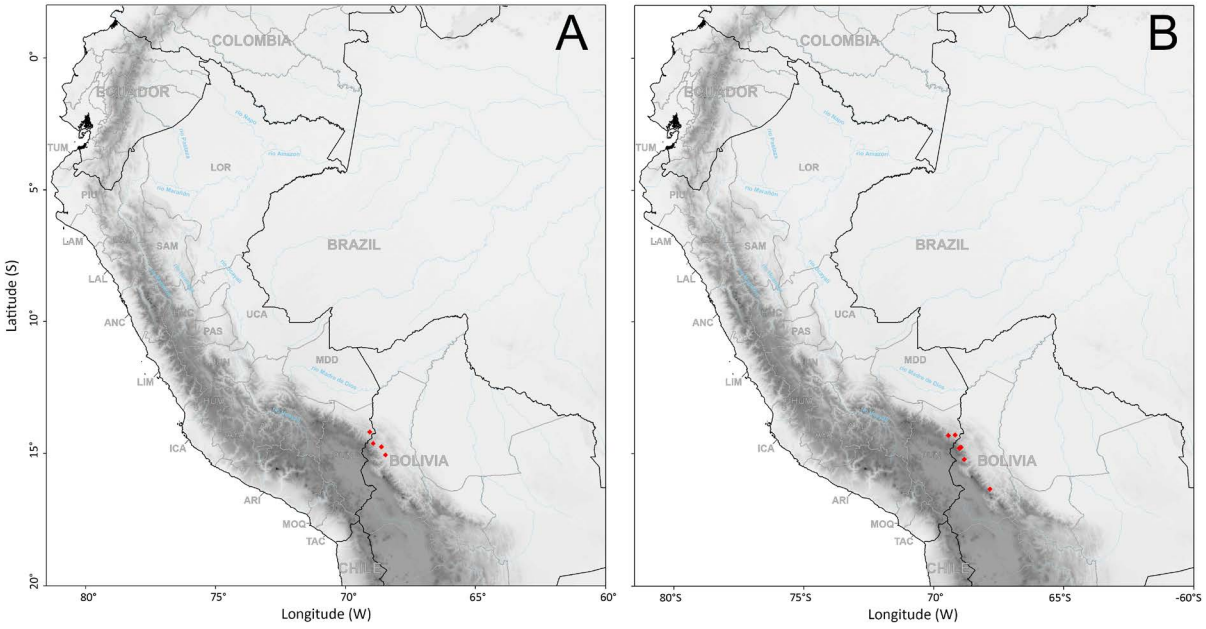


**Fig. 59.** Distribution of *Begonia* sect. *Hydristyles* A.DC. in Peru and surrounding countries. **A**. *B. andina* Rusby (red). **B**. *B. unilateralis* Rusby (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

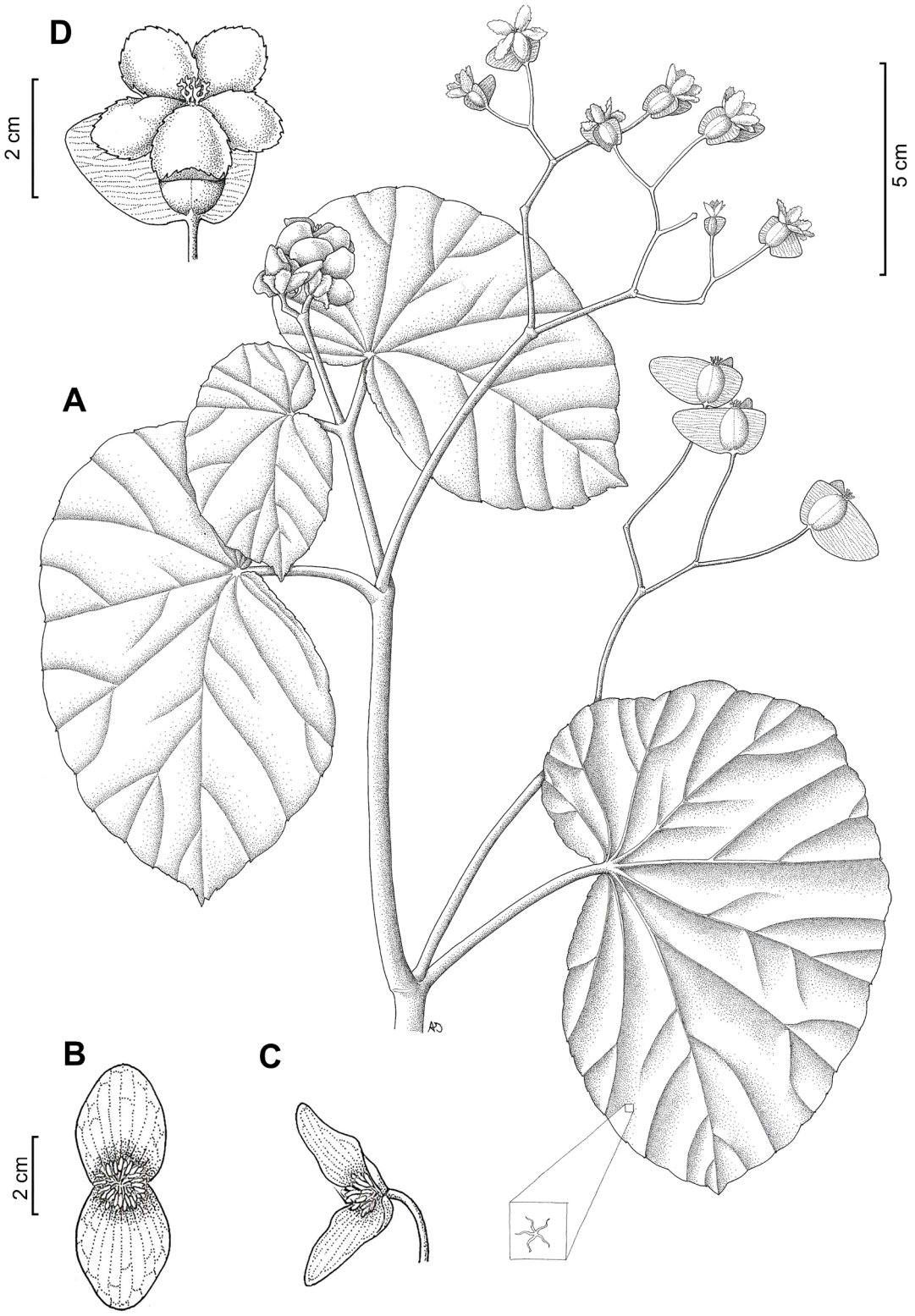


**Fig. 60.** *Begonia andina* Rusby. **A**. Habit (inset, stellate hair). **B**. Staminate flower, front view. **C**. Staminate flower, side view. **D**. Pistillate flower, front-side view. Illustration by Anna Dorward from *D.C. Washausen & A. Salas 1208* (US).

ciliate; ovary body ovoid to broadly ovoid, 2.5–7 × 2.5–6 mm, pale green flushed white to pink, sparsely to densely stellate-tomentose, unequally 3-winged, wings triangular, largest 2.5–11 × 1–10 mm, smallest 2.5–10 × 0.5–4 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2.5–4 mm long, irregularly 4–10 times-divided, stigmatic papillae in spirally twisted bands. *Fruiting pedicel* to 32 mm long. *Fruit body* broadly obovoid, to 12 × 8 mm, drying brown, wings same shape as in ovary, the largest expanding to 16 × 18 mm, the smallest expanding to 13 × 10 mm.

**Proposed conservation assessment**

Known from three collections in La Paz Department, Bolivia, and a single collection in Puno Region, Peru, with a total EOO of ca 1800 km$^2$. The species' range has a very high percentage of remaining forest cover but is under pressure from small-scale subsistence farming and cocoa production. Its few collections suggest *B. andina* is rare, and we were unable to locate it during fieldwork to Sandia Province in September 2020. We assess *B. andina* as Endangered (EN B1ab(iii)).

**Identification notes**

*Begonia andina* is a simple species to determine on account of the densely tomentose stellate-indumentum on its stems, petioles, and the underside of its leaves, which distinguishes it from all other Peruvian *Begonia* species. It may be confused with *B. unilateralis*, which also has a dense indumentum but one consisting of peltate scales. In both species, the indumentum can rub off but is usually present on most of the plant. The two species also differ in their leaf margins, which are entire to undulate in *B. andina* and serrate in *B. unilateralis*, and in the stipules and bracts, which are deciduous in *B. andina* and persistent in *B. unilateralis*.

**Distribution and ecology**

Known from Peru and Bolivia. In Peru, it has been collected in Puno Region (Fig. 59A) and is found in lower montane forest at an elevation of 1200 m a.s.l.

## 44. ***Begonia unilateralis*** Rusby

Figs 59B, 61

*Phytologia* 1 (2): 68 (Rusby 1934). – **Type**: BOLIVIA – **[La Paz Department: Prov. Sud Yungas]** • Nequejahuira; [16°20′ S, 67°50′ W]; 2435 m a.s.l.; 15–24 May 1926; *G.H.H. Tate 657*; lectotype: NY [NY00118710], designated by Smith & Schubert (1944: 81).

Foster (1958: 138); Wasshausen *et al.* (2014: 386).

*Begonia peltigera* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 79 (Irmscher 1953) – **Type**: PERU – **[Puno Region]: Prov. Sandia** • 2100–2300 m a.s.l.; [14°18′ S, 69°26′ W]; 13 Mar. 1902; *A. Weberbauer 506*; holotype: B [B100243084, B100243085, 2 sheets]. **Syn. nov.**

Brako & Zarucchi (1993: 194); León & Monsalve (2006: 167).

**Etymology**

The epithet derives from the Latin for one ('*ūnus*') and sided ('*laterālis*'). This probably refers to the leaf, which is much larger on one side of the midrib than the other.

**Specimens examined**

PERU – **Puno Region: Prov. Sandia** • ca 600 m south of Pilco; 14°17′11″ S, 69°10′06″ W; 1473 m a.s.l.; 8 Jan. 2021; *B. Melchor 776*[a]; USM.

**Description**

Caulescent herb, to 100 cm high. *Stem* erect, branching; internodes to 12 cm long, to 6 mm thick, succulent, red, with a dense indumentum of lepidote scales, the scales circular to star-shaped. *Stipules* deciduous to late deciduous, lanceolate, 6–13 × 2–4 mm, apex acuminate, translucent, red, glabrous to sparsely lepidote scaled, margin entire, aciliate. *Leaves* > 5 per stem, alternate, basifixed; petiole 0.5–5.5 cm long, red, densely lepidote scaled; blade asymmetrical, transversely ovate, to 11 × 6.5 cm, succulent, apex obtuse to short acuminate, base short-cordate to cordate, basal lobes not overlapping, sinus to 10 mm deep, margin crenate to serrate, ciliate, upper surface green, glabrous to sparsely lepidote scaled, lower surface dull green, moderately to densely lepidote scaled, veins palmate-pinnate, 5–7

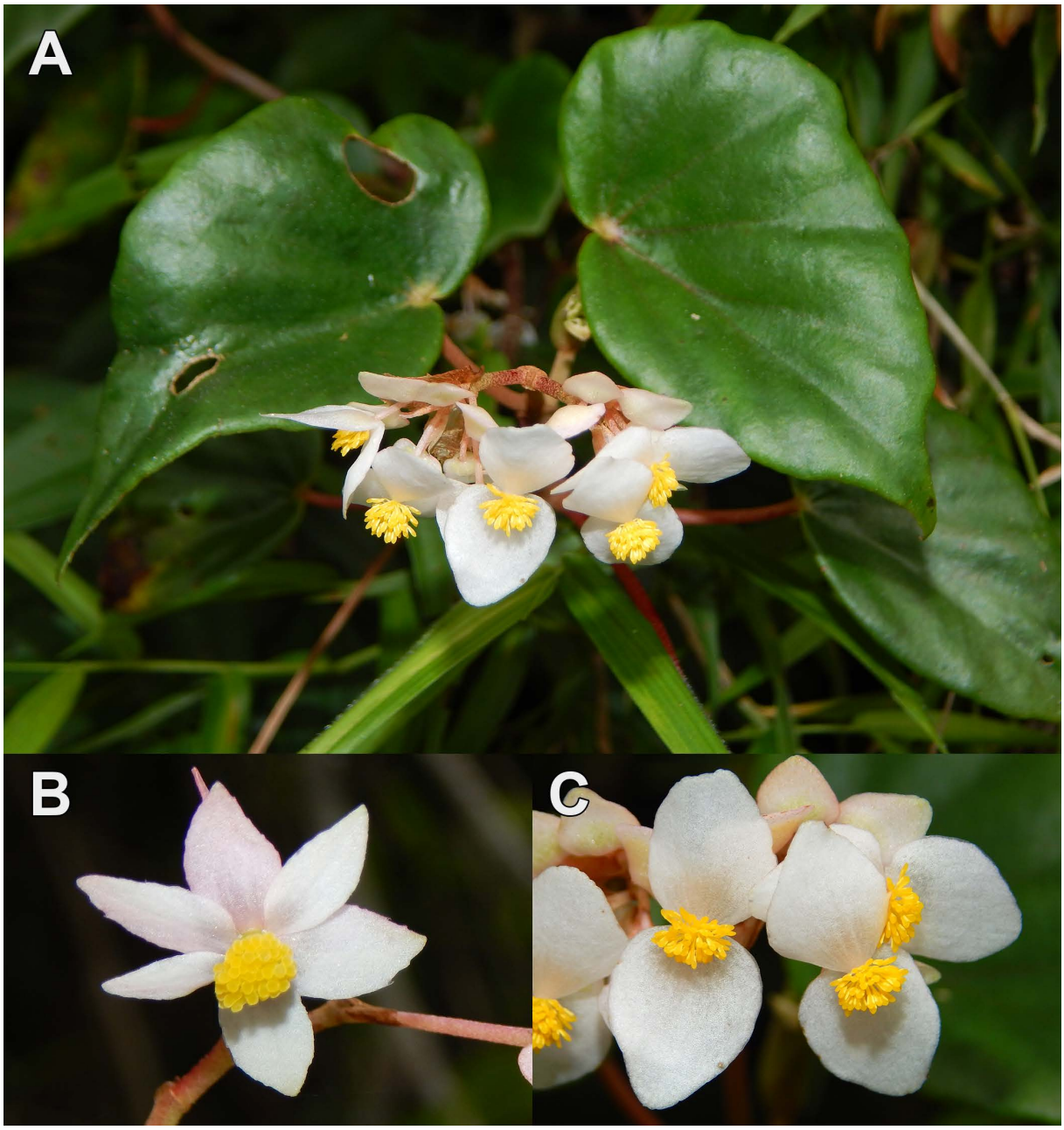


**Fig. 61.** *Begonia unilateralis* Rusby. **A**. Habit. **B**. Pistillate flower, front view. **C**. Staminate flowers, front view. All photographs taken by B. Melchor from *B. Melchor 776*[a] in Sandia Province, Puno Region.

veined from the base, with 1–3 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3 per branch, bisexual, axillary, erect, cymose, with 2 branches, bearing up to 8 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 3.5 cm long, red, with a dense indumentum of lepidote scales, bracts persistent, lanceolate to ovate, 3–6.5 × 1–3 mm, translucent, red, glabrous to lepidote scaled, apex attenuate to truncate, margin lacerate, ciliate. *Staminate flowers*: pedicels to 15 mm long, densely lepidote scaled; tepals 2, spreading, ovate, 8–14 × 8–12 mm, apex rounded, white to pink, glabrous lepidote scaled, margin entire to crenulate at the apex, aciliate; stamens 70–125, spreading, yellow, filaments 0.5–2 mm long, fused at the base onto a torus, anthers oblong, 1 × 0.75 mm, dehiscing via lateral slits, connectives extended to 0.5 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 28 mm long; bracteoles 2, positioned directly beneath the ovary, lanceolate to broadly ovate, 2.5–7 × 1.5–2 mm, apex acute to truncate, translucent, white to pink, lepidote scaled, margin lacerate, ciliate; tepals 5, rarely 6 (*B. Melchor 776*[a]), subequal, deciduous in fruit, spreading, ellipsoid to lanceolate, 4–10 × 3.5–4 mm, apex acute, white to pink, sparsely lepidote scaled, margin entire to serrulate at the apex, ciliate; ovary body ovoid, 6–7 × 3–5.5 mm, white to pink, lepidote scaled, unequally 3-winged, wings triangular, largest 6–9 × 8–10 mm, smallest 6–8 × 2–4 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 3–5 mm long, irregularly 2-many times-divided, stigmatic papillae in spirally twisted bands. *Fruiting pedicel* to 30 mm long. *Fruit body* broadly ovoid, to 10 × 8 mm, drying brown, wings same shape as in ovary, the largest expanding to 13 × 12 mm, the smallest expanding to 10 × 4 mm.

**Proposed conservation assessment**

Known from a narrow elevational band either side of the Peru-Bolivia border and has a total EOO of ca 1800 km$^2$. Within the species range, its habitat is under pressure from small-scale subsistence farming and cocoa production. We were unable to locate *B. unilateralis* during fieldwork in September 2020 and it may be rare in Peru but appears locally common in Bolivia. We assess *B. unilateralis* as Endangered (EN B1ab(iii)), which replaces the assessment of *B. peltigera* as Data Deficient (DD) by León & Monsalve (2006).

**Synonymy notes**

*Begonia peltigera* was described as the only Andean species with an indumentum of peltate scales. This character is also found on the type collection of *B. unilateralis*, which was described 24 years earlier. The type of *B. unilateralis* has a much lower density of peltate scales than that of *B. peltigera*, but scale density seems to increase in this species closer to the Peruvian border. The only other character with which we can separate the types of *B. unilateralis* and *B. peltigera* is the depth of the sinus at the leaf base and we do not consider this sufficient to maintain the two species as separate.

**Typification notes**

The protologue of *B. peltigera* cites *A. Weberbauer 506* in Berlin herbarium as type material (Irmscher 1953: 79). There are two sheets of this collection in Berlin but as they are labelled as sheets 'A' (B100243084) and 'B' (B100243085) they are two sheets of the same collection and both part of the holotype.

**Identification notes**

Easily recognised as the only species of Peruvian *Begonia* with an indumentum of gold, peltate scales, reminiscent of those of *Combretum* (Combretaceae) species. The scales are often deciduous on herbarium specimens, which gives herbarium sheets a dandruff-like covering.

### Distribution and ecology

Known from Peru and Bolivia. Within Peru, collected in Puno Region (Fig. 59B) in middle montane forest at an elevation of 1400–2440 m a.s.l.

***Begonia*** sect. ***Knesebeckia*** (Klotzsch) A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 125 (de Candolle 1859). – *Knesebeckia* Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854). – **Type**: lectotype: *Knesebeckia incarnata* (Link & Otto) Klotzsch ≡ *Begonia incarnata* Klotzsch, designated by Barkley & Baranov (1972: 4).

### Synonymy notes

For a full list of sectional synonyms, see Moonlight *et al.* (2018).

### Notes

The current circumscription of *Begonia* sect. *Knesebeckia* is a "taxonomic dustbin" composed of mostly Central American and Andean caulescent species with four tepals on the staminate flower, five tepals on the pistillate flower, and divided placentae. Moonlight *et al.* (2018) demonstrated that the section is polyphyletic with at least four clades, a central American clade including the type species and three Andean clades. Peruvian species fall into all three Andean clades, and we recognise one of these as *Begonia* sect. *Apteron* above. The two other clades are found in Peru but, as no morphological characters have yet been found to identify these clades, we do not recognise them formally herein. Rather, we group species into two informal groups, the acerifolia and the maynensis groups. While perhaps not monophyletic, these groups are easily recognisable and of use for identifying species.

The current circumscription of *Begonia* sect. *Knesebeckia* includes fifteen species in Peru, of which seven are in the acerifolia group and four are in the maynensis group. We describe one new species, provide the first record of a second, and provide one new synonym within this section. Five species are endemic to Peru.

45. ***Begonia brandbygeana*** L.B.Sm. & Wassh.

*Flora of Ecuador* 25 (133): 54 (Smith & Wasshausen 1986). – **Type**: ECUADOR – **Prov. Morona-Santiago** • Taisha, 8–10 km N-NW of the military camp; 2°21′ S, 77°31′ W; 650–700 m a.s.l.; 16 Jun. 1980; *J. Brandbyge & E. Astana C. 31965*; holotype: AAU; isotypes: QCA [QCA19521, QCA217565], US [US00221538].
Quintana & León-Yáñez (2011: 198).

### Etymology

The type collection of *B. brandbygeana* was collected by John Brandbyge, and the species is named in his honour.

### Specimens examined

PERU – **Loreto Region** • Puranchim, río Sinchiyacu, 2°50′ S, 76°55′ W; 200 m a.s.l.; 21–27 Nov. 1986; *W.H. Lewis, M. Elvin-Lewis, J. Campos & D. Fast 11874*; MO [MO-2340411], USM. – **Ucayali Region: Prov. Purús** • Dist. Purús, río Curanja, cerca la comunidad nativa Colombiana, 10°04′ S, 71°06′ W; 300–350 m a.s.l.; 16 Jul. 2002; *J.G. Graham & J. Schunke V. 1754*; US [US01944296].

**Description**

Caulescent, herb, to 40 cm high. *Stem* erect, branching; internodes to 2 cm long, to 7 mm thick, succulent, brown, glabrous. *Stipules* late deciduous, triangular, 4–8 × 2–3 mm, apex acuminate, terminating in a 2–4 mm long hair, opaque, brown, glabrous, margin entire, ciliate. *Leaves* 2–5 per stem, alternate, basifixed; petiole 0.5–2.5 cm long, colour unknown, glabrous to sparsely pilose; blade asymmetric, lanceolate, to 11.5 × 5 cm, membranaceous, apex acuminate, base rounded on the wider side of the blade, cuneate on the narrow side, margin serrate, ciliate, upper surface green, glabrous to sparsely pilose, lower surface pale green, glabrous to sparsely pilose, veins pinnate, 2–3 veined from the base, with 4–6 secondary veins on the larger side, 2–4 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 3 branches, bearing up to 8 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 9 cm long, colour unknown, glabrous, bracts persistent, ovate, 1.5–2.5 × 1 mm, translucent, colour unknown, glabrous, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 5 mm long, glabrous; tepals 5, spreading, outer 2 ovate, 5–7 × 4–5 mm, apex rounded, white to pink, glabrous, margin entire, aciliate, inner 2 oblanceolate, 5–6 × 1 mm, apex rounded, white to pink, glabrous, margin entire, aciliate; stamens ca 30, spreading, yellow, filaments ca 1 mm long, fused into a short column at the base, anthers obovoid, ca 0.5 × 0.5 mm, dehiscing via lateral slits, connectives not extending, symmetrically basifixed. *Pistillate flowers*: pedicels to 3 mm long; bracteoles 1, positioned directly beneath the ovary, filiform, 2–4 × 0.2 mm, apex narrowly-acuminate, translucent, colour unknown, glabrous, margin entire, aciliate; tepals 5 (or 6?), subequal, deciduous in fruit, spreading, ovate, 4–5 × 2–4 mm, apex obtuse, white to pink, minutely glandular pilose, margin entire, aciliate; ovary body ovoid, ca 2.5 × 1 mm, colour unknown, minutely glandular pilose, subequally 3-winged, wings triangular, largest 6–9 × 2–3 mm, smallest 6–9 × 1–2 mm; 3-locular, placentae unknown; styles 3, yellow, free, 3–4 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 3 mm long. *Fruit body* ovoid, to 15 × 5 mm, drying brown, wings same shape as in ovary, the largest expanding to 19 × 6 mm, the smallest expanding to 19 × 5 mm.

**Proposed conservation assessment**

Assessed by Quintana & León-Yáñez (2011) as Vulnerable (VU D2) on the basis of the type specimen. We add two collections to the species' distribution and extend its EOO to > 12 000 km$^2$. We reassess *B. brandbygeana* as Vulnerable (VU D2).

**Notes**

The collections we cite here are the first tentative records of *B. brandbygeana* from Peru. We cannot be entirely confident about the identification of these specimens, which collectively have a single staminate flower, no pistillate flowers, and no fruits. In all vegetative respects; however, these collections are indistinguishable from *B. brandbygeana*.

**Identification notes**

*Begonia brandbygeana* is most similar to *B. maynensis* A.DC. as both species have erect stems with late-deciduous stipules and more or less lanceolate leaf blades. They can be distinguished by the apices of their stipules (acuminate in both species but ending in a 2–4 mm long hair in *B. brandbygeana*) and their inflorescence, which branches up to 6 times in *B. maynensis* but only twice in *B. brandbygeana*. The leaves of *B. brandbygeana* also dry translucent whereas those of *B. maynensis* dry opaque, suggesting it has more membranaceous leaves.

**Distribution and ecology**

Known from Ecuador and Peru. Within Peru, known from Loreto and Ucayali Regions at an elevation of 200–350 m a.s.l. (Fig. 62A). *Begonia brandbygeana* has been collected in *terra firme* forest and close to small to medium sized rivers within Amazonian forest.

46. ***Begonia parcifolia*** C.DC.
Figs 62A, 63

*Smithsonian Miscellaneous Collections* 69 (12): 10 (de Candolle 1919). – **Type**: ECUADOR – **[Prov. Loja]** • Cariamanga; [4°19′ S, 79°33′ W]; 24 Apr. 1910; *C.H.T. Townsend 947*; lectotype: US [US00115415], designated by Smith & Wasshausen (1979: 244).

Smith & Wasshausen (1979: 244, 1986: 37); Quintana & León-Yáñez (2011: 200); Esquerre-Ibañez & Tebbitt (2018: 451).

*Begonia nervidens* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 614 (Irmscher 1949). – **Type**: ECUADOR – **Prov. El Oro** • Between Portovelo and El Tambo; [3°45′ S, 79°48′ W]; 600–1000 m a.s.l.; 2 Sep. 1923; *A.S. Hitchcock 21279*; lectotype: US [US00115402] **designated here**; isolectotype: NY • between Loja and Portovelo, 3–6 Oct. 1918, *J.N. Rose, A. Pachano & G. Rose 23364*; syntype: US [US00221802]; isosyntype NY.

Smith & Wasshausen (1979: 244).

*Begonia gorgonea* Tebbitt, *Edinburgh Journal of Botany* 68 (2): 178 (Tebbitt 2011) – **Type**: PERU – **Cajamarca Region: Prov. Chilete** • Alrededores de Sangal Alto (carretera Chilete-San Pablo); [7°09′ S, 78°50′ W]; 1800 m a.s.l.; 26 Dec. 1970; *A. Lopez M. & A. Sagastegui A. 7627*; holotype: NY [NY01085845]; isotype: HUT [HUT no. 7783]. **Syn. nov.**

### Etymology

The name of this species means few-leaved in Latin.

### Specimens examined

PERU – **Tumbes Region: Prov. Zarumilla** • Pampas de Hospital, entre el cruce al puesto de vigilancia Cabo Cotrina y el Caucho; ca 3°59′ S, 80°24′ W; 450 m a.s.l.; 23 Oct. 1988; *C. Díaz & R. Vásquez*

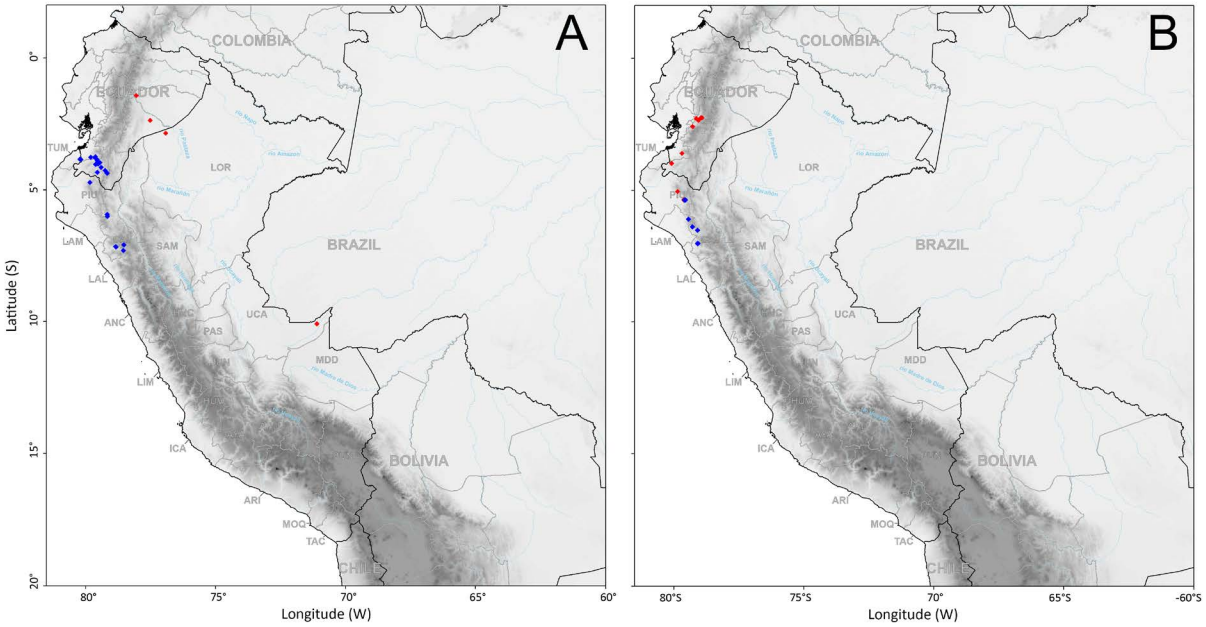


**Fig. 62.** Distribution of *Begonia* sect. *Knesebeckia* in Peru. **A.** *B. brandbygeana* L.B.Sm. & Wassh. (red) and *B. parcifolia* (blue). **B.** *B. piurensis* L.B.Sm. & B.G.Schub. (red) and *B. velata* L.B.Sm. & B.G.Schub. (blue). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

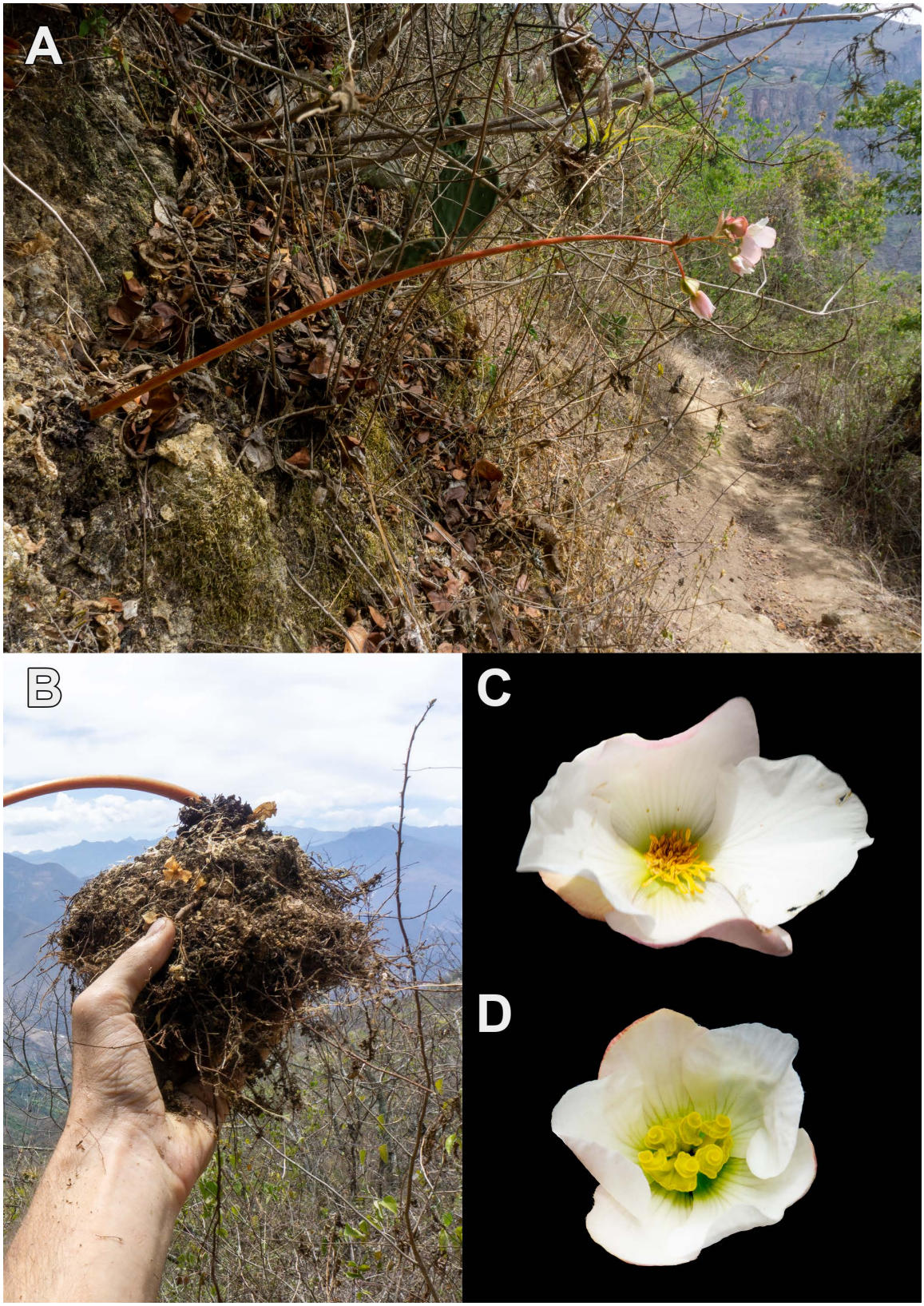


**Fig. 63.** *Begonia parcifolia* C.DC. **A**. Habitat. **B**. Tuber. **C**. Staminate flower, front view. **D**. Pistillate flower, front view. All photographs taken by P.W. Moonlight from *P.W. Moonlight & A. Daza 1927* in Jaén Province, Cajamarca Region.

*3115*; MO [MO-2228042], USM • Dist. Matapalo, Bosque nacional de Tumbes, región de "bosque seco subtropical" cerca de Campo Verde; [3°50′ S, 80°11′ W]; 600–800 m a.s.l.; 4 Jan. 1968; *D.R. Simpson & J. Schunke V. 562*; F, G, NY, US [US00222273], USM. – **Piura Region: Prov. Ayabaca** • camino entre Las Lomas y Ayabaca, inmediatamente sobre el puente Tondopa, 4°42′ S, 79°50′ W; 955–1627 m a.s.l.; 29 May 2015; *M.C. Tebbitt & A. Daza 845*; E, MOL. – **Cajamarca Region: Prov. Jaén** • Colasay, bosque seco; 5°55′ S, 79°10′ W; 1600 m a.s.l.; 8 Dec. 2001; *R. Vásquez, R. Rojas & L. Campos 27225*; HUT, MO [2: MO-2981281, MO-2981282, USM • Dist. Pucará, Caserio Sondor; 6°00′ S, 79°10′ W; 1400 m a.s.l.; 29 Jun. 1993; *D. MilanowskI & I. Shonle 57*; MO [MO-1641537]. – **Prov. Chilete** • Dist. San Pablo, road from San Pablo to San Miguel, ca 9 km from San Pablo at El Palto; 7°04'13′ S, 78°51′50.1″ W; 16 Nov. 2019; 1745 m a.s.l.; *P.W. Moonlight 1928*; USM • Dist. San Pablo, footpath 500 m N of Sangel on road from Chilete to San Pablo; 7°08′05.7″ S, 78°50′32.5″ W; 1953 m a.s.l.; 16 Nov. 2019; *P.W. Moonlight 1927*; USM. – **Prov. Cajabamba** • Dist. San Juan, puente los Naranjos, km 128 carretera Pascomayo-Cajamarca; [7°17′ S, 78°33′ W]; 1700 m a.s.l.; 28 Nov. 1981; *I. Sánchez V. 2716*; CPUN, MO [MO-2218604].

### Description

Acaulescent, tuberous herb, to 45 cm high. *Tuber* spheroid, to 20 cm in diameter, often with an elongated, vertically-held 2 cm thick and up to 10 cm long rhizome-like structure at the top, branching at the top into 1–3 growing points. *Stipules* persistent, triangular, 4–14 × 2–10 mm, apex acute, apiculate, opaque, dark brown, glabrous, margin entire to irregularly serrate, ciliate. *Leaves* 1–4 per growing point, alternate, basifixed but appearing superficially peltate when young; petiole 5–25 cm long, red, sparsely to densely hirsute; blade subsymmetric, ovate, to 18.5 × 13.5 cm, succulent, apex acute, base obliquely cordate, basal lobes overlapping to not overlapping, sinus to 60 mm deep, margin irregularly dentate, long-ciliate, upper surface green, sparsely hirsute, lower surface pale green, sparsely to densely hirsute, veins palmate, 6–10 veined from the base. *Inflorescences* 1–3 per rhizome, bisexual, axillary, erect, a subsymmetric cyme, with up to 5 branches, bearing up to 6 staminate flowers and 3 pistillate flowers, protandrous; peduncle to 45 cm long, red, glabrous to densely hirsute, bracts late deciduous, elliptic to ovate, 6–21 × 2–18 mm, translucent, white, glabrous, apex rounded, margin entire, ciliate. *Staminate flowers*: pedicels to 30 mm long, glabrous; tepals 4, spreading, outer 2 elliptic to ovate, 14–28 × 10–22 mm, apex acute to rounded, white, sometimes pink outside, glabrous, margin entire, aciliate, inner 2 broadly-lanceolate, 8–30 × 5–16 mm, apex acute to obtuse, white, glabrous, margin entire, aciliate; stamens 50–100, spreading, yellow, filaments 2–5 mm long, fused at the base, anthers ovoid, 1.5–2 × 0.5 mm long, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 30 mm long; bracteoles lacking; tepals 5, subequal, persistent in fruit, projecting, the largest ovoid, 8–28 × 4–15 mm, apex rounded, white, glabrous, margin entire, aciliate, the smallest lanceolate, 6–20 × 4–12 mm, apex rounded, white, glabrous, margin entire, aciliate; ovary body ovoid, 6–10 × 5–12 mm, green to red, glabrous, sub-equally 3-winged, wings triangular, 7–14 × 2–5 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2–4 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 30 mm long. *Fruit body* ovoid, to 13 × 12 mm, drying light brown, wings same shape as in ovary, expanding to 15 × 17 mm.

### Proposed conservation assessment

Previously assessed by Quintana & León-Yáñez (2011) and Esquerre-Ibañez & Tebbitt (2018) as Vulnerable (VU B1ab(iii) and VU D2, respectively). The EOO of our circumscription of *B. parcifolia* is > 35 000 km$^2$ and there is no evidence of population decline. The species was observed to be widespread and common in Cajamarca Region during fieldwork in November 2019. We assess *B. parcifolia* as Least Concern (LC), which also replaces the vulnerable (VU D2) assessment of *B. gorgonea* Tebbitt by Tebbitt (2011).

**Synonymy notes**

Tebbitt (2011) described *B. gorgonea* based upon material collected in the Chilete and Cajabamba Provinces of Cajamarca Region. He distinguished the species based upon its peltate leaves and thickened, underground rhizome-like rootstock. During fieldwork carried out in 2019 at the type locality and surrounding areas we were unable to locate material matching this description and found *B. parcifolia* to be plentiful. The young leaves of *B. parcifolia* grow with their basal lobes overlapping and thus can appear peltate. Indeed, all isotypes and paratypes held at HUT and CPUN clearly show basifixed leaves but with overlapping basal lobes. Furthermore, the plants at the type locality were found to have large tubers, from which a thick, rhizome-like structure was occasionally found. We conclude that *B. gorgonea* is synonymous with *B. parcifolia*.

**Typification notes**

The protologue of *B. parcifolia* cites the collection *C.H.T. Townsend 947* but no herbarium (de Candolle 1919: 10), thus this name required lectotypification. Smith & Wasshausen (1979) cited a duplicate in US herbarium (US00115415) as a holotype, which counts as an effective lectotypification. A lectotype is also required for *B. nervidens* Irmsch. The protologue for this name cites a duplicate of each of *J.N. Rose 23364* and *A.S. Hitchcock 21279*, both held at US herbarium (Irmscher 1949: 614). Esquerre-Ibañez & Tebbitt (2018) cited *A.S. Hitchcock 21279* at US (US00115402) as the holotype but this is incorrect and does not count as an effective lectotypification because it occurred after the 1st of January 2001 (Turland *et al.* 2018: Article 9.23). We designate this sheet as the lectotype.

**Identification notes**

*Begonia parcifolia* is most similar to *B. bifurcata* L.B.Sm. & B.G.Schub. Both species are found in northwest Peru and are tuberous, acaulescent species with four tepals on their staminate flowers and five on their pistillate flowers. They occur in different environments, with *B. parcifolia* primarily found in dry forests and *B. bifurcata* found in humid, montane forests. They are easily distinguished when in flower: *B. parcifolia* has glabrous tepals while the outer surface of the staminate and pistillate flowers of *B. bifurcata* have a red, glandular pilose indumentum. When sterile, they can be distinguished by their indumentum: the petioles and leaves of *B. bifurcata* have a red, glandular pilose indumentum while those of *B. bifurcata* have a white, hirsute indumentum.

**Distribution and ecology**

Known from Peru and Ecuador. Within Peru, it has been collected in Tumbes, Piura, and Cajamarca Regions (Fig. 62A). Found in coastal dry forests in Tumbes Region at an elevation of 450–800 m a.s.l. and dry forest and scrubland in Piura and Cajamarca at an elevation of 955–1953 m a.s.l. *Begonia parcifolia* typically grows on rocky slopes, especially in areas where clouds condense during the rainy season. It is a geophyte and dies down to its tuber in the dry season and flowers shortly before the beginning of the rainy season (October to January) and throughout the wet season (until June).

47. ***Begonia piurensis*** L.B.Sm. & B.G.Schub.

*Publications of the Field Museum of Natural History, Botanical Series* 13 (4/1): 197 (Smith & Schubert 1941a). – **Type**: PERU – **Piura Region: Prov. Huancabamba** • Quebradas immediately NW of Canchaque; on clay banks beside trail, also commonly along road below Canchaque; [5°22′ S, 79°36′ W]; 1200 m a.s.l.; 4 Apr. 1939; *H.E. Stork 11393*; holotype: UC [UC640259]; isotypes: G, GH [GH00068265], K.

Smith & Schubert (1952: 39); Smith & Wasshausen (1979: 247, 1983: 298, 1986: 52); Brako & Zarucchi (1993: 194).

### Etymology

The type specimen was collected in Peru's Piura Region by H.E. Stork and the species is named for this locality.

### Specimens examined

PERU – **Piura Region: Prov. Morropón** • El Palto-Santo Domingo, 5°02′55″ S, 79°51′07″ W; 1320 m a.s.l.; 22 Jun. 2004; *A. Sagástegui A., C. Téllez, F. Torres, M. Berrú & W. García 17485*; US [US01913139]. – **Prov. Huancabamba** • Dist. Canchaque, Chorro Blanco; 5°21′01″ S, 79°36′13″ W; 1500–1900 m a.s.l.; 18 Jun. 1987; *C. Díaz & S. Baldeón M. 2465*; F, MO [MO-098011], USM • Dist. Canchaque; [5°22′ S, 79°36′ W]; 1200–1300 m a.s.l.; 22 May 1948; *R. Ferreyra 3092*; USM • Dist. Canchaque, Ravine 100 m from centre of Canchaque, over metal suspension footbridge, 5°22′30″ S, 79°36′23″ W; 1199 m a.s.l.; 27 Jan. 2016; *P.W. Moonlight & A. Daza 111*; E [E00885468], MO, MOL.

### Description

Caulescent, tuberous herb, to 1 m high. *Tuber* spheroid, ca 4 × 4 cm, with 1 growing point. *Stem* erect, unbranched; internodes to 20 cm long, to 7 mm thick, succulent, green, glabrous. *Stipules* deciduous, ovate, ca 12 × 6 mm, apex acute, translucent, pale green, glabrous, margin entire, aciliate. *Leaves* 3–5, alternate, basifixed; petiole 3–8.5 cm long, light green, glabrous; blade asymmetric, ovate, to 16 × 8 cm, succulent, apex acuminate, base cordate, basal lobes not overlapping, sinus to 2 mm deep, margin dentate, ciliate, upper surface dark green, glabrous, lower surface pale green, glabrous, veins palmate-pinnate, 6–8 veined from the base, with 2–4 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 6 branches, bearing up to 32 staminate flowers and 32 pistillate flowers, protandrous; peduncle to 11 cm long, pale green, glabrous, bracts deciduous, elliptic to ovate, 4–6 × 1.5–4 mm, opaque, pale brown, glabrous, apex truncate, margin undulate, ciliate. *Staminate flowers*: pedicels to 10 mm long, glabrous; tepals 4, spreading, outer 2 ovate, 6–8 × 6–7 mm, apex rounded, white, glabrous, margin entire, ciliate, inner 2 oblanceolate, 7–8 × 2–3 mm, apex rounded, white to pink, glabrous, margin entire, aciliate; stamens ca 25, spreading, free, filaments 1.5–3 mm long, free, anthers elliptic, 0.5–1 × 0.4 mm, dehiscing via lateral slits, connectives extending to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 27 mm long; bracteoles lacking; tepals 5, subequal, deciduous in fruit, spreading, obovate to broadly obovate, 4.5–9 × 2–7.5 mm, apex obtuse, white to pink, glabrous, margin entire, aciliate; ovary body ovoid, 4.5–7 × 4–6.5 mm, white to pink, glabrous, sub-equally 3-winged, wings triangular, 5.5–10.5 × 3.5–8.5 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 2 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 32 mm long. *Fruit body* ovoid, to 9 × 8 mm, drying brown, wings same shape as in ovary, expanding to 11 × 10 mm.

### Proposed conservation assessment

Known from two populations within Peru, which are both close to rapidly expanding villages and vulnerable to agricultural and urban expansion. It is relatively common and frequently collected in Ecuador where it is known from ca 5 populations, and the total EOO of the species is ca 18 400 km$^2$. Given the species' EOO, relatively few populations, and the threats to its Peruvian populations, we assess *B. piurensis* as Vulnerable (VU B1ab(iii)).

### Identification notes

*Begonia piurensis* is most similar to *B. velata* L.B.Sm. &. B.G.Schub. (see below) but superficially resembles several species of *B.* sect. *Cyathocnemis* in that it is a large, upright herb with stems with elongate internodes and transversely ovate leaves. It differs from all species in this section in its staminate flowers with four tepals (vs two) and in having a tuber, but this is rarely recorded on herbarium labels.

Note that while *B. piurensis* is tuberous we include it in the key as both a tuberous and non-tuberous species because this character is only noted on a single Peruvian specimen label.

### Distribution and ecology

Known from Ecuador and Peru, including Piura Region in Peru. Known from northwest Peruvian relict montane forest at an elevation of 1200–1900 m a.s.l. (Fig. 62B). *Begonia piurensis* is a tuberous species, and it appears to die back to its tuber in the dry season before beginning to grow at the start of the wet season (January) before flowering and fruiting later in the wet season (April to June).

## 48. ***Begonia velata*** L.B.Sm. & B.G.Schub.
Fig. 64

*Publications of the Field Museum of Natural History, Botanical Series* 13 (4/1): 201 (Smith & Schubert 1941a). – **Type**: PERU – **Piura Region: Prov. Huancabamba** • Above Palambla; [5°22′ S, 79°34′ W]; 2700–2800 m a.s.l.; 1909–1914; *A. Weberbauer 6021*; holotype: GH [GH00068297]; isotypes: F [V0042337F, V0042336F], NY [NY00118713], US [US00115492].
León & Monsalve (2006: 170).

### Etymology

From the Latin '*velatus*', meaning 'partially hidden from view'. This most likely refers to the large bracts of the species, which obscure the young inflorescence.

### Specimens examined

PERU – **Lambayeque Region: Prov. Lambayeque** • Bosque Chiñama; [6°06′ S, 79°26′ W]; 2500–2600 m a.s.l.; 23 Aug. 1988; *A. Cano 2087*; US [US00222347]. – **Cajamarca Region: Prov. San Miguel de Pallaques** • Dist. Agua Blanca, Caserío Agua Blanca, Bosque del Cerro Quillón; 7°01′54″ S, 79°04′10″ W; 3100–3300 m a.s.l.; 11 May 2005; *E. Rodríguez R., E. Alvítez I. & S. Orroyo A. 2720*; E [E01007287], HUT [HUT41989], US [US00951216]. – **Prov. Cutervo** • Carretera entre Llama y Huambos, Tunaspampa; [6°31′ S, 79°05′ W]; 2600–2900 m a.s.l.; 21 Apr. 1988; *C. Díaz & S. Baldeón M. 2880*; F, MO [MO-098016]). – **Prov. San Miguel de Pallaques** • Cerro Quillón; [7°01′ S, 79°04′ W]; 3200 m a.s.l.; 5 Mar. 1986; *J. Mostacero L., S. Leiva G., F. Mejla C. & F. Paláez P. 1258*; HUT.

### Description

Caulescent, tuberous herb, to 1 m high. *Tuber* ellipsoid, to 2 × 4 cm but likely much larger, with 1 growing point. *Stem* erect, unbranched; internodes to 14 cm long, to 10 mm thick, succulent, green to red, glabrous. *Stipules* deciduous, lanceolate to ovate, 4–12 × 4–8 mm, apex acute, translucent, colour unknown, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 2–13 cm long, pale brown to green, glabrous; blade transversely ovate, to 24 × 11 cm, membranaceous, apex acuminate, base cordate, basal lobes not overlapping, sinus to 40 mm deep, margin serrate, with 3–5 triangular lobes on the broad side of the leaf and often with one on the narrow side of the leaf, aciliate, upper surface green, glabrous, lower surface green, glabrous, veins palmate-pinnate, 6–8 veined from the base, with 3–5 secondary veins on the larger side, 2–4 secondary veins on the smaller side. *Inflorescences* 2–4 per stem, bisexual, axillary, erect, cymose, with up to 3 branches, bearing up to 8 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 24 cm long, pale brown, glabrous to sparsely minute-glandular pilose at the apex, bracts deciduous, ovate, 15–28 × 9–22 mm, translucent, white, sparsely minute-glandular pilose, apex rounded to obtuse, margin entire, aciliate. *Staminate flowers*: pedicels to 45 mm long, sparsely minute-glandular pilose; tepals 4, spreading, outer 2 ovate, 22–45 × 16–30 mm, apex short-acuminate, white, sparsely minute-glandular pilose, margin entire to serrulate, aciliate, inner 2 obovate, 16–35 × 12–26 mm, apex rounded, white, sparsely minute-glandular pilose, margin

entire, aciliate; stamens 45–50, spreading, yellow, filaments 2.5–4 mm long, free, anthers ovoid, 0.6–1 × 0.5 mm long, dehiscing via lateral slits, connectives extending to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 40 mm long; bracteoles 2, positioned directly beneath the ovary, ovate, 18–20 × 12–18 mm, apex rounded, translucent, white, glabrous, margin entire to serrate, aciliate; tepals 5, subequal, persistence unknown, projecting, the largest broadly-lanceolate to ovate, 18–30 × 8–22 mm, apex acuminate, white, sparsely minute-glandular pilose, margin entire, aciliate, the smallest lanceolate to ovate, 12–14 × 6–12 mm, apex obtuse, white, glabrous, margin entire, aciliate; ovary body obovoid, 9–14 × 6–10 mm, colour unknown, glabrous, unequally 3-winged, wings triangular, largest 12–17 × 6–15 mm, smallest 8–15 × 3–12 mm; 3-locular, placentae branches divided, bearing ovules on both

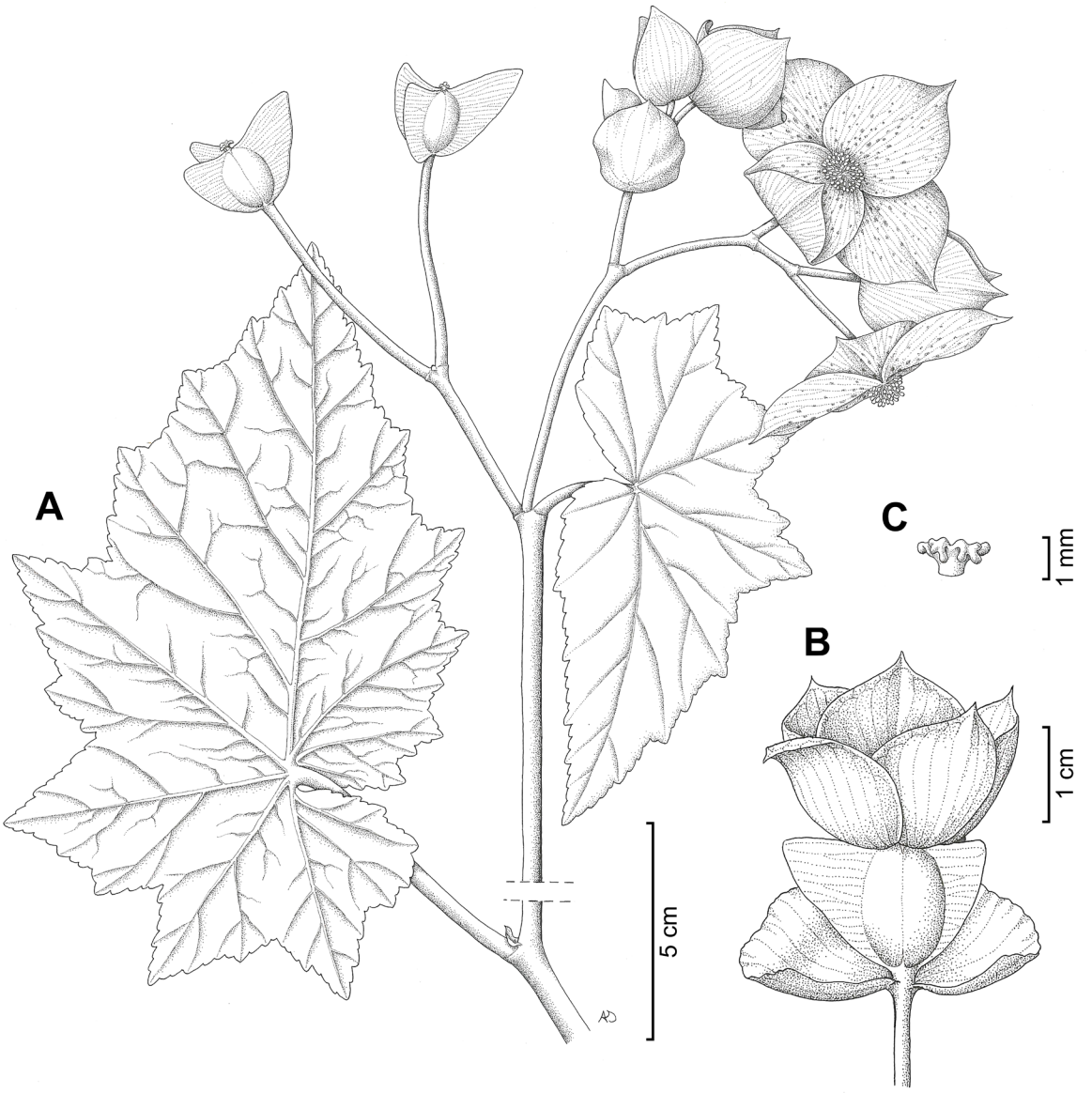


**Fig. 64.** *Begonia velata* L.B.Sm. & B.G.Schub. **A**. Habit. **B**. Pistillate flower and bracteoles, side view. **C**. Stigma and styles drawn from a desiccated fruit, side view. Illustration by Anna Dorward from *E. Rodríguez R., E. Alvítez I. & S. Orroyo A. 2720* (US).

surfaces; styles 3, yellow, free, 4–6 mm long, once-divided, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 50 mm long. *Fruit body* ovoid, to 17 × 13 mm, drying brown, wings same shape as in ovary, largest expanding to 17 × 17 mm, smallest expanding to 15 × 13 mm.

**Proposed conservation assessment**

Assessed by León & Monsalve (2006) as Data Deficient (DD) and reassessed by Tebbitt (2016) as Vulnerable (VU D2). Known from five fragments of highly threatened northwest Peruvian relict montane forest on the western slopes of the Andes. The most distant sites are approximately 200 km apart and none of the five sites are protected. Given the species low EOO (ca 2500 km$^2$), its few known localities and fragmented distribution, and the threats to its habitat, we reassess *B. velata* as Endangered (EN B1ab(iii)).

**Notes**

Tebbitt (2017) speculated on a possible hybrid origin of *B. velata*, highlighting the possible role of *B. acerifolia* and *B. ludwigii* as parents. Tebbitt's concept of *B. velata* was a misapplied name (see Notes under *B. huancabambae* Moonlight sp. nov.) and *B. velata* is clearly most closely related to *B. piurensis*. These two species are the only tuberous species of Andean *Begonia* with > 50 cm tall stems. These two species are both found in the Amotape-Huancabamba Region of northern Peru and southern Ecuador. The new species is found further south than *B. piurensis*, which is only found within Piura Region in Peru, and the two species appear to be ecologically distinct. *Begonia piurensis* is found to an elevation of 2000 m a.s.l. whereas *B. velata* has only been collected above 2600 m a.s.l. in cooler forest where most of the precipitation is from fog.

**Identification notes**

*Begonia velata* is most similar to *B. piurensis*, but is easy to distinguish when in flower or fruit by its larger bracts (15–28 × 9–22 mm vs 4–6 × 1.5–4 mm); its larger staminate flowers (44–90 mm wide vs 12–16 mm wide); its bracteolate pistillate flowers (vs ebracteolate); and its larger fruits bodies (to 17 × 12 mm vs 9 × 8 mm). When sterile, *B. velata* may be distinguished from *B. piurensis* by the cusps on the longest edge of its leaf, which give the blade an angular appearance.

Many specimens of *B. velata* have also been confused with the superficially similar *B. acerifolia* and *B. huancabambae* sp. nov.), which are both rhizomatous rather than tuberous herbs but have similarly shaped leaves. Within the range of *B. velata*, both species have a conspicuous indumentum on both sides of the leaf lamina.

**Distribution and ecology**

Endemic to Peru and known from Lambayeque and Cajamarca Regions (Fig. 62B), where it is found in northwest Peruvian montane forests at an elevation of 2500–3300 m a.s.l. *Begonia velata* is a tuberous species and dies back to its tuber in the dry season (June to November).

## *The acerifolia group of Begonia sect. Knesebeckia*

The acerifolia group of *Begonia* sect. *Knesebeckia* was defined by Tebbitt (2016) to include ten Andean species of *Begonia*, though two of the original members are now considered synonyms (Tebbitt *et al.* 2017). It includes relatively seasonally dry adapted members of the section that die back to above-ground stems in the dry season. Recent phylogenetic evidence demonstrates that this group is polyphyletic (Moonlight *et al.* 2018) but we retain it here as it is a useful morphological grouping. Following Moonlight *et al.* (2018) we exclude *B. urubambensis* from the group, which differs in lacking an above ground-stem and is distantly related to other species in the group.

Of the seven currently recognised members of the acerifolia group, six are found in Peru and two are endemic.

49. ***Begonia acerifolia*** Kunth in Humboldt *et al.* (1825)
Figs 1C, 2F, 65A, 66

*Nova Genera et Species Plantarum (quarto ed.), vol. 7*: 186, t. 644 (Humboldt *et al.* 1825). – **Type**: ECUADOR – **[Prov. Loja]** • Loxam; 1060 m a.s.l.; *A.J.A. Bonpland 3333*; lectotype: P [P00679517], designated by (2017: 221).

de Candolle (1864: 306); Smith & Schubert (1952: 36); Smith & Wasshausen (1979: 246, 1986: 48); Brako & Zarucchi (1993: 191); Moonlight & Fuentes (2022: 39).

*Begonia erythrocarpa* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 121 (de Candolle 1859). – **Type**: BOLIVIA – **Dept. La Paz: Prov. Larecaja** • May 1847; *H.A. Weddell 4729*; lectotype: P [P01900755], designated by Tebbitt (2017: 221); isolectotypes: G-DC ex P, P [P01900754].

de Candolle (1864: 285); Smith & Schubert (1952: 37, 1955: 114); Smith & Wasshausen (1979: 239, 1986: 38); Brako & Zarucchi (1993: 192); Wasshausen *et al.* (2014: 384); Tebbitt (2017: 221).

*Begonia dolabrifera* C.DC., *Bulletin de L'Herbier Boissier II* 2 (8): 324 (de Candolle 1908). – **Type**: ECUADOR • Pallatanga; [2°01′ S, 78°58′ W]; Sep. 1891; *L. Sodiro 594*; holotype: G [G00237358, photo K, F, MO]; isotypes: F [V0052627F], G, P [P01900768], QPLS.

Smith & Wasshausen (1979: 246).

*Begonia griseocaulis* Irmsch., *Bibliotheca Botanica* 116: 112 (Irmscher 1937). – **Type**: ECUADOR – **Prov. Chimborazo** • Tal des Rio Chanchan, oberhalb Huigra; [2°16′ S, 78°57′ W]; 1600 m a.s.l.; 23 Sep. 1933; *L. Diels 1173*; holotype: B [B101068556].

Smith & Wasshausen (1979: 244); Tebbitt (2017: 221).

*Begonia pennellii* L.B.Sm. & B.G.Schub., *Publications of the Field Museum of Natural History, Botanical Series* 13 (4/1): 186 (Smith & Schubert 1941a). – **Type**: PERU – **Cusco Region** • Above "Pillahuata", Cerro de Cusilluyoc; [13°10′ S, 71°36′ W]; 2800–3100 m a.s.l.; *F.W. Pennell 14126*; holotype: GH [GH00068262]; isotypes: B [B100365224], PH [PH00007794].

Smith & Schubert (1950: 86, 1955: 114); Tebbitt (2017: 221).

*Begonia triramosa* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 613 (Irmscher 1949). – **Type**: ECUADOR – **[Prov. Chimborazo]** • Vicinity of Huigra, mostly on the Haciendade Licay; [3°10′ S, 78°59′ W]; 3 Sep. 1918; *J.N. Rose & G. Rose 22493b*; holotype: US [US00115477, photo NY].

Smith & Wasshausen (1979: 244, 1986: 43); Quintana & León-Yáñez (2011: 201); Tebbitt (2017: 221).

*Begonia pennellii* subsp. *lobato-ovata* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 776 (1): 85 (Irmscher 1953). – **Type**: PERU – **Cusco Region: Prov. Calca** • Dist. Lares, Lares valley above Mantoc; [12°58′ S, 72°58′ W]; 2400– 2500 m a.s.l.; 8 Mar. 1929; *A. Weberbauer 7906*; lectotype: B [B101068564], **designated here**; isolectotypes: F [ illustration B [B101068565]], BM [BM001191435], GH [GH00068264], NY [NY03091037], U [U1144413], US [US00222073].

Smith & Schubert (1950: 86, 1955: 114); Irmscher (1953: 84); Golding & Karegeannes (1984: 498); Tebbitt (2017: 221).

*Begonia pennellii* subsp. *lobato-ovata* var. *longiloba* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76 (1): 85 (Irmscher 1953). – **Type**: PERU – **Ayacucho Region: Prov. Huanta** • Weg von Tambo über Osno zum Flusse Apurimac; [12°44′ S, 73°58′ W]; 2700–2800 m a.s.l.; 1 Jun. 1910; *A. Weberbauer 5622*; lectotype: B [B101068561], **designated here**; isolectotypes: B [B101068562], F [photo K, P, illustration B [B101068563]], NY.

Golding & Karegeannes (1984: 498); Tebbitt (2017: 221).

*Begonia pennellii* subsp. *lobato-ovata* var. *longiloba* forma *macrantha* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76 (1): 86 (Irmscher 1953). – **Type**: PERU – **Píura Region: Prov. Ayabaca** • Westabhänge der Anden über Frias; [4°56′ S, 79°54′ W]; 2900–3000 m a.s.l.; 20 May 1912; *A. Weberbauer 6402*; holotype: B [B100243083].

Golding & Karegeannes (1984: 498); Tebbitt (2017: 221).

*Begonia lobato-peltata* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76 (1): 86 (Irmscher 1953). – **Type**: PERU – **Puno Region: Prov. Sandia** • [14°18′ S, 69°27′ W]; 2100–2300 m a.s.l.; 10 Jul. 1903; *A. Weberbauer 503*; lectotype: B [B100243008], designated by Tebbitt (2017: 222); isolectotypes: B [B100243009], G.

Smith & Wasshausen (1979: 244).

*Begonia macbrideana* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76 (1): 87 (Irmscher 1953). – **Type**: PERU – **Junín Region: Prov. Tarma** • Entre Huacapistana y Palca; [11°14′ S, 75°32′ W]; 2200 m a.s.l.; *A. Weberbauer 2011*; lectotype: B [B101068557], **designated here**; isolectotypes: B [B101068558, B101068559, B101068560]; MOL [MOL00002991].

Smith & Wasshausen (1984: 468); Tebbitt (2017: 221).

*Begonia xerophyta* L.B.Sm. & Wassh., *Phytologia* 44 (4): 245 (Smith & Wasshausen 1979). – **Type**: ECUADOR – **Prov. Loja** • Between Loja and San Lucas, very steep and dry slope; ca 2100 m a.s.l.; [3°45′ S, 79°15′ W]; 8 Oct. 1955; *E. Asplund 18036*; holotype: S [S04-762].

Smith & Wasshausen (1986: 44); Quintana & León-Yáñez (2011: 201); Tebbitt (2017: 221).

### Etymology

Named for the superficial resemblance of the species' leaves to those of maples (*Acer* L., Sapindaceae).

### Selected specimens examined

PERU – **Piura Region: Prov. Ayabaca** • Montaña de Cuytas, 8 km NE of Ayabaca; 4°32′ S, 79°44′ W; 2400–2410 m a.s.l.; *A.H. Gentry, C. Díaz & R. Ortiz 75123*; MO [MO-1910846], USM • Cerro Chacas; [4°36′ S, 79°41′ W]; 2820 m a.s.l.; 27 Mar. 2006; *M. Farfán Sandoval 25*; HUT • Dist. Ayabaca, Las Lomas to Ayabaca road, above Chinchinpampa; 4°40′ S, 79°45′ W; 2710 m a.s.l.; 28 May 2015; *M.C. Tebbitt & A. Daza 843*; MOL. – **Prov. Morropón** • Dist. Chalaco, Chalaco village, road Chalaco up to emsata; 5°01′20″ S, 79°47′10″ W; 2730 m a.s.l.; 3 Dec. 2002; *K. Hoenselaar 512*; U • Dist. Chalaco, Vista Alegre, Bosque Mija; 5°04′07.2″ S, 79°43′07.7″ W; 2920 m a.s.l.; *I. Sánchez V., A. Cordova A. 12146*; CPUN. – **Prov. Huancabamba** • [5°22′ S, 79°34′ W]; 1 Nov. 1876; *É.F. André 4396*; K [2], NY • Above Canchaque on the Huancabamba pass; 5°22′39″ S, 79°33′32″ W; 2371 m a.s.l.; 27 Jan. 2016; *P.W. Moonlight & A. Daza 120*; E [E00885880], MO, MOL • Cerro Porculla 3–11 km W of Continental Divide down W slope of Cerro; [5°52′ S, 79°31′ W]; 12 Jun. 1966; *G. Edwin, J. Schunke V. 3763*; US [US00222015], USM. – **Amazonas Region: Prov. Chachapoyas** • Ladera del Cerro Tambo Viejo, road between Balsas and Leymebamba; 6°47′ S, 77°56′ W; 2810 m a.s.l.; 24 May 2015; *M.C. Tebbitt & A. Daza 831*; E, MOL. – **Cajamarca Region: Prov. Cutervo** • Gruta Blanca, Parque Nacional San Andrés; [6°14′ S, 78°45′ W]; 2400 m a.s.l.; 24 Feb. 1985; *S. Llatas Q. 1170*; US [US00424990]. – **Prov. Chota** • Dist. La Paccha, Rajopampa; [6°26′ S, 78°45′ W]; 2600 m a.s.l.; 21 Jul. 1993; *J. Cabanillas S. 756*; CPUN • Near Las Palmas, ca 24km NE of Chota; 6°29′25″ S, 78°37′25″ W; 2789 m a.s.l.; 17 Apr. 1993; *M.O. Dillon, I. Sánchez V. & M. Sánchez M. 6330*; CPUN, F • Cuchuli-Chetilla, Chalamarka; [6°30′ S, 78°30′ W]; 2600 m a.s.l.; 2 Aug. 2011; *L. García Llatas 7913*; HUT. – **Prov. Santa Cruz** • Dist. Pulan, El Cedro; [6°46′ S, 78°55′ W]; 2600 m a.s.l.; 31 Jan. 2008; *L. Santa Cruz 2106*; USM • Dist. Catache, upper río Zaña valley, ca 5 km above Monte Seco on path to Chorro Blanco; [6°51′ S, 79°06′ W]; 1500–2000 m a.s.l.; 16–18 Mar. 1986; *M.O. Dillon, A. Sagastegui A., D. Dillon, P. Alcorn, J. Santisteban, S. Leiva, C. Téllez & M. Guzmán 4390*; MO [MO-1643551]. – **Prov. Hualgayoc** • Monte Seco, 6°47′33″ S, 78°30′10″ W; Aug. 1949, *J.J. Soukup 3876*; COL, US [US002222016]. –

**Prov. San Miguel** • Bosque de Quellahorco, noreste de la localidad de Tongod; [6°43′ S, 78°47′ W]; 2700 m a.s.l.; 14 Sep. 1991; *I. Sánchez V. & A. Briones 5800*; CUZ • Dist. La Florida, above La Florida; 6°53′ S, 79°03′ W; 1787 m a.s.l.; *M.C. Tebbitt & A. Daza 847*; MOL. – **Junín Region: Prov. Tarma** • Huacapistana; [11°14′ S, 75°31′ W]; 2135 m a.s.l.; Oct. 1943; *C. Sandeman 4583*; K, OXF. – **Cusco Region: Prov. Calca** • Dist. Lares, Suyo; 12°28′ S, 71°35′ W; 2634 m a.s.l.; 16 Jun. 2005; *L. Valenzuela, E. Suclli, I. Huamantupa, J. Farfán, N. Anaya, H. Coasaca & J. Tito 5654*[a]; MO [MO-1664124] • Dist. Yanatile, above intersection of roads coming from Amparaes, Quebrada Honda, and Lares, along road to Amparaes; 12°58′ S, 72°03′ W; 3660 m a.s.l.; *M.C. Tebbitt & A. Daza 797*; E [E01059298], MOL • Road between Calca and Colca, descending to Colca; 13°01′48″ S, 72°02′10″ W; 2000–2600 m a.s.l.; 27 Apr. 2006; *H. van der Werff, L. Valenzuela, E. Suclli & A. Carazas 20995*; MO [MO-2184526], US [US00951225]. – **Prov. La Convención** • Dist. Huayopata, San Luis; 12°23′ S, 72°44′ S, 1047–3200 m a.s.l.; 11 Apr. 2003; *W. Galiano, P. Núñez, E. Suclli, E. Acurio & A. Rodríguez 4825*; MO [MO-492722] • Dist. Santa Ana, "Quillabamba", 12°50′04.5″ S, 72°47′20.8″ W; 2009 m a.s.l.; 16 Mar. 2017; *A. Orejuela, J. Castillo & M. Suarez 2865*; E [E01053422], USM • Dist. Vilcabamba, Vilcabamba, Pajonal, 13°07′27″ S, 72°58′55″ W; 3470–3540 m a.s.l.; 31 May 2002; *W. Galiano, L. Valenzuela, E. Suclli, I. Huamantupa & F. Carazas 4108*; MO [MO-300885]. – **Prov. Quispicanchi** • Dist. Santa Ana, Madre Selva; 12°53′49″ S, 72°45′02″ W; 1500 m a.s.l.; *L. Valenzuela, E. Suclli & G. Calatayud 3090*; MO [MO-1102916] • Marcapata, en los alrededores de la mina cerca de la ciudad de Marcapata, en la carretera Cusco-Maldonado; 13°25′25″ S, 70°54′16″ W; 3200 m a.s.l.; *P. Núñez & N. Núñez 8200*; MO [MO-1835951] • 33 km past the peak on road from Ocongate to Marcapata, just before Opispata; [13°35′ S, 70°59′ W]; 3110 m a.s.l.; 22 Jul. 1978; *J. Aronson & P. Berry 525*; MO [MO-1642893], US [US00672874]. – **Prov. Paucartambo** • Entre Esperanza y Pillahuata, km 133 de la carretera Paucartambo-Pilcopata; [13°10′ S, 71°36′ W]; 2650 m a.s.l.; 18 Feb. 1990; *A. Cano & K. Young 3045*; HUT, USM • Pillahuata, Parque Nacional Manu; [13°10′ S, 71°36′ W]; 2700–2900 m a.s.l.; 24 Mar. 1992; *A. Cano 5272*; USM • Pilco; [13°11′ S, 71°37′ W]; 3000 m a.s.l.; 19 Jan. 1953; *F. Woytkowski 339*; MOL. – **Prov. Urubamba** • Dist. Ollaytaytambo, road from Quillabamba to Ollaytaytambo; 13°05′07″ S, 72°22′52″ W; 3173 m a.s.l.; 7 Aug. 2014; *P.W. Moonlight & A. Daza 96*; E [E00835900], MOL • Dist. Machu Picchu, Alcamayo, nacientes del río, 13°09′ S, 72°30′ W; 2900 m a.s.l.; *I. Huamantuba, J. Farfán & G. Huallparimachi 3227*; MO [MO-1102543], US [US00843963] • Huiñayhuayna; [13°11′ S, 72°32′ W]; 2300 m a.s.l.; *C.M. Ochoa 1*; MO [MO-1835894] • Huiñaihuaina; [13°12′ S, 72°32′ W]; 3000 m a.s.l.; 22 Jul. 1948; *J.C. Vargas Calderón 7243*; US [US00222070]. – **Puno Region: Prov. Carabaya** • Dist. Ollanchea, road directly below Ollanchea; 13°37′ S, 70°28′ W; 1949 m a.s.l.; 9 Jan. 2015; *M.C. Tebbitt & A. Daza 810*; E [E01059297], MOL. – **Prov. Sandia** • San Gabán, below Chichacori; [13°49′ S, 70°29′ W]; 2970 m a.s.l.; 6 Jun. 1954; *R.B. Fisher 31*; BM • 8 km N of Limbani; [14°05′ S, 69°41′ W]; 3000 m a.s.l.; 19 May 1942; *R.D. Metcalf 30543*; G, MO [MO-1642892], US [US00222074] • Entre Sandia y Cuyucuyo; [14°26′ S, 69°31′ W]; 3100–3200 m a.s.l.; 16 May 1966; *R. Ferreyra 16771*; MO [MO-1642864], USM [2].

## Description

Caulescent, rhizomatous herb, to 200 cm high. *Rhizome* ellipsoid, 7–20 × 0.75–3 cm, branching, with > 1 growing point per branch. *Stem* erect, branching; internodes to 20 cm long, to 30 mm thick, succulent, becoming woody at maturity, pale green to red or brown, glabrous to tomentose. *Stipules* persistent on the rhizome, deciduous on the stem, ovate, 15–18 × 8–14 mm, apex acute, opaque, pale green flushed red, glabrous, margin entire, aciliate. *Leaves* 1–5 per stem, alternate, basifixed or peltate; petiole 5.5–60 cm long, pale green to red, glabrous to tomentose; blade subsymmetric, ovate to orbicular in outline, to 30 × 23 cm, succulent, apex acute, base peltate to cordate, basal lobes overlapping to not overlapping, sinus to 45 mm deep, margin with 6–8 triangular lobes around the lamina, serrulate to serrate, ciliate, upper surface pale green to dark green, occasionally with white patches along the major veins, glabrous to hirsute, lower surface green to red, moderately pubescent, veins peltate or palmate but with one primary vein, 6–9 veined from the base, with 2–4 secondary veins on the larger side, 1–3

secondary veins on the smaller side. *Inflorescences* 1 per stem, bisexual, axillary, erect, cymose, with up to 3 branches, bearing up to 8 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 53 cm long, green flushed red, glabrous, bracts deciduous, ovate, 11–16 × 9–10 mm, opaque, green to brown, glabrous, apex obtuse, margin entire, aciliate. *Staminate flowers*: pedicels to 30 mm long, glabrous; tepals 4, spreading, outer 2 ovate to broadly ovate, 21–24 × 18–24 mm, apex obtuse to rounded, white, sometimes flushed green or pink, glabrous, margin entire to serrate, aciliate, inner 2 elliptic to broadly

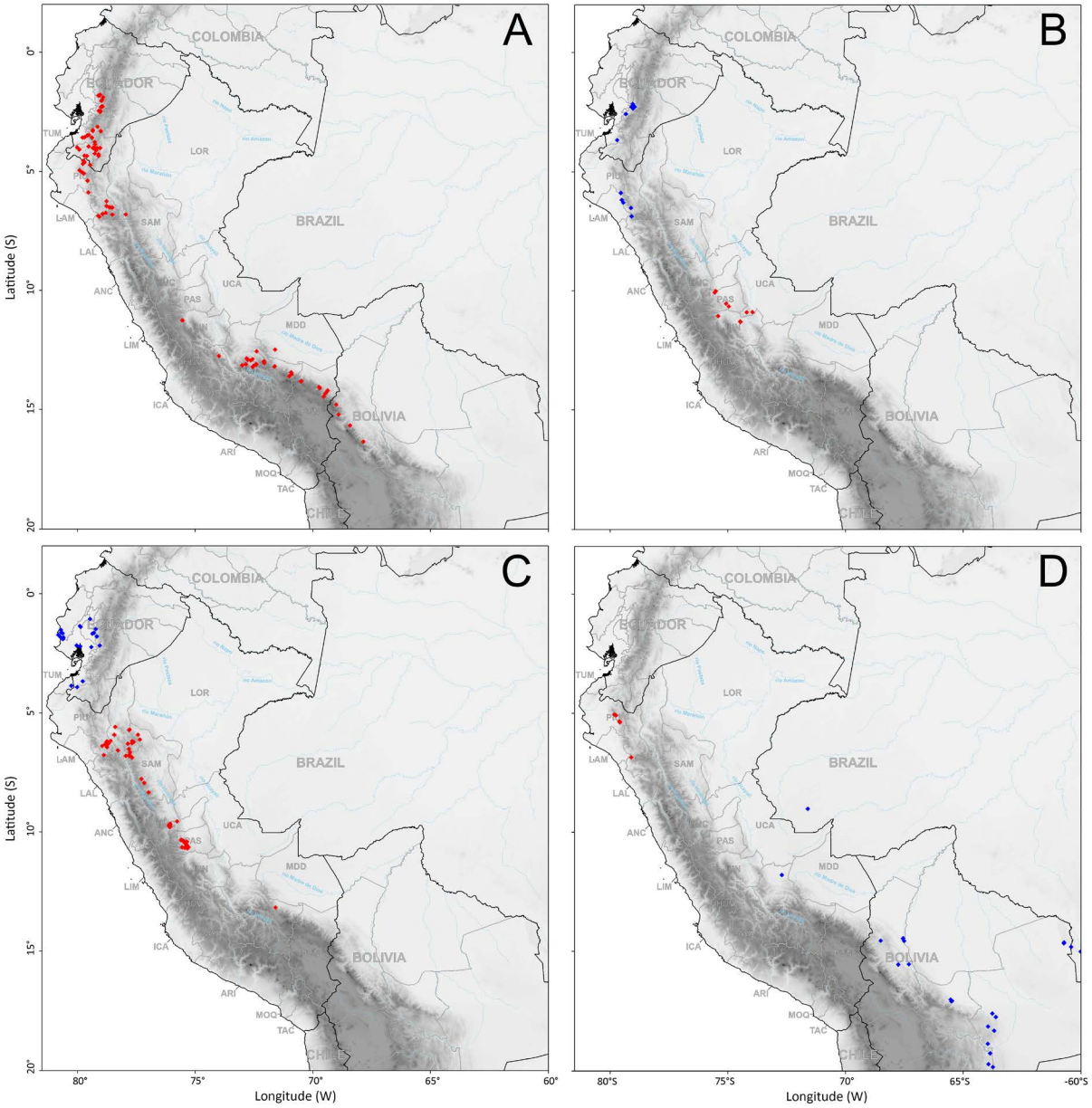


**Fig. 65.** Distribution of the acerifolia group of *Begonia* sect. *Knesebeckia* (Klotzsch) A.DC. in Peru and surrounding countries. **A**. *B. acerifolia* Kunth (red). **B**. *B. arrogans* Irmsch. (red) and *B. ludwigii* Irmsch. (blue). **C**. *B. monadelpha* (Ruiz ex Klotzsch) A.DC. (red) and *B. serotina* A.DC. (blue). **D**. *B. huancabambae* Moonlight sp. nov. (red) and *B. wollnyi* Herzog (blue). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.


**Fig. 66.** *Begonia acerifolia* Kunth. **A**. Habit. **B**. Leaf, adaxial surface. **C**. Leaf, abaxial surface. **D**. Inflorescence. **E**. Bracts of varying ages, back view. **F**. Bracts of varying ages, front view. **G**. Staminate flower, front view. **H**. Staminate flower, back view. **I**. Tepals of the staminate flower, back view. **J**. Androecium, side and front view. Photographs taken by D.A. Purvis (A–H) and P.W. Moonlight (I–L) in the living collections of the Royal Botanic Garden Edinburgh (Accession 20141063, grown from seeds collected as part of *P.W. Moonlight & A. Daza 96*).

obovate, 7–25 × 8–18 mm, apex acute to rounded, white, sometimes flushed green or pink, glabrous, margin entire, aciliate; stamens 50–100, spreading, yellow, filaments 1–2.5 mm long, fused at the base, anthers obovoid to obovoid-cuboid, 1–2 × ca 1 mm long, dehiscing via lateral slits, connectives not extending, symmetrically basifixed. *Pistillate flowers*: pedicels to 40 mm long; bracteoles absent; tepals 5, subequal, deciduous in fruit, spreading, elliptic to broadly ovate, 15–19 × 7–17 mm, apex obtuse to rounded, white, sometimes flushed white or pink, glabrous, margin entire, aciliate; ovary body ellipsoid to ovoid, 5–15 × 5–9 mm, pale green flushed pink, glabrous, unequally 3-winged, the largest rectangular 14–24 × 12–21 mm, the smallest rib-like, to 1 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, fused at the base, 5–7 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 40 mm long. *Fruit body* ovate, to 15 × 19 mm, drying brown, the largest wing expanding to 25 × 25 mm, the smallest expanding to 2 mm wide.

**Proposed conservation assessment**

Assessed as Least Concern (LC) by Tebbitt (2017).

**Typification notes**

*Begonia pennellii* subsp. *lobato-ovata* Irmsch. was described based upon duplicates of the collection *A. Weberbauer 7906* held in Chicago and Berlin (Irmscher 1953: 85). No specimen was cited as a holotype, so it is appropriate to designate a lectotype. We designate the duplicate held in Berlin [B101068564] as the lectotype, as it is an excellent and highly complete specimen. The variety *B. pennellii* subsp. *lobato-ovata* var. *longiloba* Irmsch. was described in the same publication based upon duplicates of *A. Weberbauer 5622* held in Berlin and Chicago herbaria (Irmscher 1953: 85). There are two excellent sheets of this collection held in Berlin, so we choose one [B101068562] as the lectotype of this name.

The protologue of *B. Macbrideana* Irmsch. cited specimens of the collection *A. Weberbauer 2011* held in Berlin herbarium (Irmscher 1953: 87). There are three duplicates of this specimen held in Berlin, so it is appropriate to designate a lectotype form among this material. We choose B101068557 as the lectotype as it is the most complete of the three duplicates.

**Identification notes**

*Begonia acerifolia* is a variable species and the second most common species in Peru with large (> 10 × 10 cm) leaf laminae with lobate leaves after *B. parviflora*. The latter species is easy to distinguish from *B. acerifolia* as a tall (> 2 m high) herb with > 100 flowers per inflorescence (vs up to 16) and leaves with an indumentum that is rough to the touch. Individuals with peltate leaves are unmistakable but care should be taken to ensure candidate specimens with basifixed leaves do not have red flowers (*B. monadelpha*), a ring of trichomes at the apex of the petiole (*B. ludwigii* or *B. huancabambae* sp. nov.), fewer than 40 stamens per staminate flower (*B. arrogans* Irmsch.), or fruits with subequal wings (*B. wollnyi*).

**Distribution and ecology**

Known from Ecuador, Peru, and Bolivia. In Peru, it has been collected in Piura, Amazonas, Cajamarca, Junín, Cuzco, and Puno Regions (Fig. 65A). Found in upper and middle montane forest and northwest Peruvian relict montane forest at an elevation of 1500 to at least 3660 m a.s.l. Some collections may have been made as high as 4600 m a.s.l. in elevation, but the stated elevation on the specimen labels is unusually broad. Populations of *B. acerifolia* vary from fully deciduous to evergreen.

50. ***Begonia arrogans*** Irmsch.
Figs 65B, 67

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 606 (Irmscher 1949). – **Type**: PERU – **[Pasco Region: Prov. Oxapampa]** • Pichis trail between Azupizú and Santa Rosa; [10°39′ S, 74°57′ W]; 650 m a.s.l.; 28 Jun.–8 Jul. 1929; *E.P. Killip & A.C. Smith 26137*; lectotype: US [US00115245], designated by Tebbitt *et al.* (2018a: 223); isolectotypes: F [V0042320F], NY [NY00112291].
Brako & Zarucchi (1993: 191); León & Monsalve (2006: 165); Tebbitt *et al.* (2018a: 223).

**Etymology**

The epithet derives from the Latin '*arrogans*', meaning 'proud'. This presumably refers to the striking colours of the species' young leaves.

**Specimens examined**

PERU – **Ucayali Region: Prov. Atalaya** • Road from Puerto Ocopa to Atalaya, ca km 105; 10°53′23″ S, 73°57′01″ W; 553 m a.s.l.; 15 Feb. 2016; *P.W. Moonlight & A. Daza 250*; E [E00885608], MOL • Km 53 of road from Puerto Ocopa to Atalaya; 10°53′50″ S, 74°11′39″ W; 835 m a.s.l.; 14 Feb. 2016; *P.W. Moonlight & A. Daza 242*; E [E00885554], MOL. – **Pasco Region: Prov. Oxapampa** • Route from Pozuzo to Codo de Pozuzo; 10°00′22″ S, 75°30′31″ W; 655 m a.s.l.; 20 Feb. 2016; *P.W. Moonlight & A. Daza 285*; E [E00885609], MOL • Camino to mirador from Pozuzo; 10°03′59″ S, 75°32′57″ W; 792 m a.s.l.; 20 Feb. 2016; *P.W. Moonlight & A. Daza 277*; E [E00885610] • Along road Chatarra–Cacazu, disturbed forest; 10°32′ S, 75°04′ W; 700 m a.s.l.; 13 Aug. 2003; *H. van der Werff 18425*; MO [MO-437477]. – **Junín Region: Prov. Chanchamayo** • ca 9.5 km NW of San Ramón on dirt road along E side of río Oxabamba valley; 11°03′22″ S, 75°24′30″ W, 1042 m a.s.l.; 22 Jun. 2014; *P.W. Moonlight & A. Daza 27*; E [E00835499], USM. – **Prov. Satipo** • Road Mazamari–Puerto Ocopa, path to waterfall; 11°17′08″ S, 74°27′45″ W; 610 m a.s.l.; 30 Sep. 2007; *R.T. Pennington & A. Daza 1982*; E [E00567574] • Route from Mazamari to Puerto Ocapa. Path to catarata Arco Iris, ca 25 m on to trail; 11°18′01″ S, 74°27′26″ W; 562 m a.s.l.; 14 Feb. 2016; *P.W. Moonlight & A. Daza 239*; E [E00885547], MOL. – **Cultivated** • Grown in the Royal Botanic Garden Edinburgh from *P.W. Moonlight & A. Daza 239* RBGE Living Accession 20160124b; 15 Mar. 2021; *P.W. Moonlight 1950*; E.

**Description**

Caulescent herb, to 100 cm high. *Stem* erect, rarely branching; internodes to 12 cm long, to 20 mm thick, succulent, becoming hardened at maturity, pale brown, glabrous. *Stipules* late deciduous, oblong-ovate, 11–22 × 4–9 mm, apex acute, setose, opaque, pale green, glabrous, margin entire, aciliate. *Leaves* 1–5 per stem, alternate, basifixed; petiole 10–20 cm long, green to red, glabrous; blade asymmetric, transversely ovate to oblong-ovate, to 42 × 21 cm, succulent, apex acute to acuminate, base cordate, basal lobes not overlapping, sinus to 55 mm deep, margin with 0–4 irregular triangular lobes, lengthening towards the apex of the leaf, crenate, ciliate, upper surface green, sometimes flushed silver between the veins, glabrous, lower surface pale green to deep red, glabrous, veins palmate-pinnate, 4–6 veined from the base, with 3–6 secondary veins on the larger side, 3–5 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with up to 6 branches, bearing up to 16 staminate flowers and 16 pistillate flowers, protandrous; peduncle to 23 cm long, pale green to red, glabrous, bracts deciduous, ovate to oblong, 6–15 × 2.5–7 mm, opaque, white flushed pink, glabrous, apex acute, margin entire to serrulate at the apex, aciliate. *Staminate flowers*: pedicels to 17 mm long, glabrous; tepals 4, spreading, outer 2 broadly ovate, 6–17 × 6–16 mm, apex rounded, white flushed pink, glabrous, margin entire, aciliate, inner 2 elliptic, 4–11 × 1.5–3 mm, apex rounded, white, glabrous, margin entire, aciliate; stamens 30–40, spreading, orange, filaments 0.5–4 mm long, free, anthers

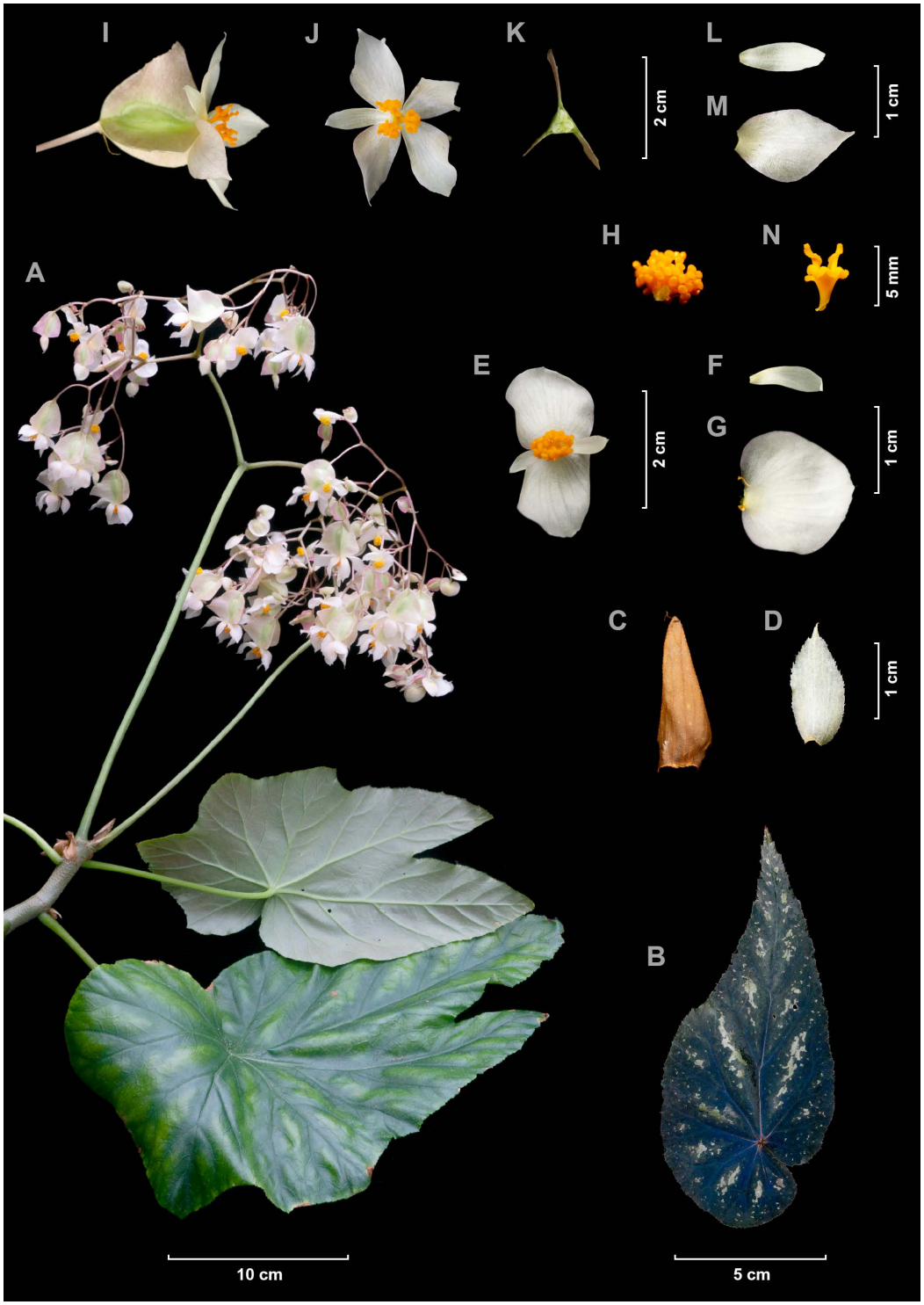


**Fig. 67.** *Begonia arrogans* Irmsch. **A**. Habit with sun leaves. **B**. Shade leaf, adaxial surface. **C**. Stipule. **D**. Bract, adaxial surface. **E**. Staminate flower, front view. **F**. Smallest tepal of the staminate flower. **G**. Largest tepal of the staminate flower. **H**. Androecium, side view. **I**. Pistillate flower, side view. **J**. Pistillate flower, front view. **K**. Cross section of ovary. **L**. Smallest tepal of the pistillate flower. **M**. Largest tepal of the pistillate flower. **N**. Gynoecium, side view. All photographs taken by D.A. Purvis & P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh (Accession 20160124, grown from seeds collected as part of *P.W. Moonlight & A. Daza 239*).

obovoid, ca 0.3 × 0.2 mm, dehiscing via lateral slits, connectives extended to 0.1 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 30 mm long; bracteoles 0–2, positioned directly beneath the ovary, filamentous, 1–3 mm long, opaque, white to brown, glabrous, margin entire, aciliate; tepals 5, subequal, persistent in fruit, spreading, elliptic to ovate, 5–21 × 2–11 mm, apex rounded, white flushed pink, glabrous, margin entire to serrulate at the apex, aciliate; ovary body ellipsoid to ovoid, 7–14 × 3–7 mm, white flushed pink, glabrous, unequally 3-winged, wings semi-circular to triangular, largest 12–20 × 6–17 mm, smallest 10–20 × 3–13 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow-orange, free, 1.5–9 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 18 mm long. *Fruit body* ovoid, to 14 × 8 mm, drying brown, wings same shape as in ovary, the largest expanding to 20 × 17 mm, the smallest expanding to 20 × 13 mm.

**Proposed conservation assessment**

Assessed by Tebbitt *et al.* (2018a) as Least Concern (LC).

**Identification notes**

*Begonia arrogans* is most like *B. wollnyi* and the two species can be easily distinguished when with staminate flowers as *B. wollnyi* has 50–100 stamens and *B. arrogans* has 30–40. Distinguishing sterile material is more difficult. *Begonia wollnyi* tends to have more (5–8 vs 0–3) lobes to each leaf blade and those lobes are more deeply cut (to half the length of the leaf rather than a third). Interestingly, mature leaves of *B. wollnyi* tend to be more patterned and more iridescent than the first few leaves on the same plant, whereas the opposite is true in *B. arrogans*.

**Distribution and ecology**

Endemic to Peru and known from Ucayali, Pasco, and Junín Regions (Fig. 65B). Found in Amazonia and lower montane forest at an elevation of 550–1050 m a.s.l. *Begonia arrogans* has a succulent stem and drops its leaves in the dry season, which is usually from September to February. The species flowers at the start of the dry season, usually after the leaves have been dropped.

51. ***Begonia huancabambae*** Moonlight sp. nov.
urn:lsid:ipni.org:names:77323295-1
Figs 65D, 68

*Begonia velata* auct. non L.B.Sm. & B.G.Schub.: Tebbitt, *Edinburgh Journal of Botany* 74 (2): 226 (Tebbitt 2017).

*Begonia velata* auct. non L.B.Sm & B.G.Schub.: Moonlight *et al.*, *Taxon* 67 (2): 295 (Moonlight *et al.* 2018).

**Diagnosis**

Most similar to *B. acerifolia* but differs in having a ring of trichomes at the leaf apex (vs glabrous or with scattered hairs at the leaf apex); and in having sub-symmetrical leaves that are orbicular in outline (vs asymmetrical with an ovate outline).

**Etymology**

Named for the Huancabamba depression, which is where the species is found. The area is likely a centre of origin of Andean begonias.

### Type

PERU – **Cajamarca Region: Prov. Cotumazá** • Bosque Cachil; [6°23′ S, 79°17′ W]; 2500 m a.s.l.; 16 Jun. 1994; *A. Ságastegui A. & S. Leiva G. 15307*; holotype: US [US0051126]; isotype: MO [MO-1643554].

### Selected specimens examined

PERU – **Piura Region: Prov. Morropón** • Dist. Chalaco, cima del cerro Mijal; [5°05′ S, 79°45′ W]; 3100 m a.s.l.; 10 May 2003; *I. Sánchez V., R. Cruz C. & E. Peña C. 11952*; CPUN. – **Prov. Huancabamba** • Canchaque-Minas Turmalina; [5°03′ S, 79°49′ W]; 2200 m a.s.l.; 23 Jul. 1975; *A. Ságastegui A., J. Cabanillas S. & O. Dios C. 8279*; HUT, MO [MO-2180420], US [US00222067] • Dist. Canchaque, Chorro Blanco; [5°20′ S, 79°36′ W]; 1500–1900 m a.s.l.; 17 Apr. 1987; *C. Díaz & S. Baldeón M. 2457*; MO [MO-1643556], USM • Above Palambla; 5°22′ S, 79°35′ W; 1711–2300 m a.s.l.; 27 May 2014; *M.C. Tebbitt & A. Daza 838*; MOL • Above Canchanque on the Huancabamba pass; 5°22′35″ S, 79°34′59″ W; 1758 m a.s.l.; 27 Jan. 2016; *P.W. Moonlight & A. Daza 107*; E [E00885597], MO [MO-3254800], MOL • ca 70 km east of Olmos; [5°51′ S, 79°31′ W]; 2035 m a.s.l.; *H. Ellenberg 3705*; US [US00222069]; – **Cajamarca Region: Prov. Cotumazá** • ca 3 km (por aire) ENE Monteseco; [6°51′ S, 79°06′ W]; 1800 m a.s.l.; 9 May 1987; *J. Santisteban C. & J. Guevara B. 34*; F, HUT, MO [MO-1643550], NY, US [US00222346].

### Description

Caulescent, rhizomatous herb, to 200 cm high. *Rhizome* ellipsoid, 5–20 × 0.75–2.5 cm, unbranched, with > 1 growing point per branch. *Stem* erect, unbranched; internodes to 19 cm long, to 8 mm thick, succulent, pale red, glabrous. *Stipules* persistent on the rhizome, tardily deciduous on the stem, ovate, 5–18 × 5–9 mm, apex acuminate, opaque, pale green, glabrous, margin entire, aciliate. *Leaves* 1–5 per stem, alternate, basifixed; petiole 3–25 cm long, pale green to red, glabrous but with a ring of squamous hairs at the apex of the petiole; blade subsymmetric, orbicular in outline, to 25 × 32 cm, succulent, apex acuminate, base cordate, basal lobes not overlapping, sinus to 8.5 mm deep, margin with 4 or 6 triangular lobes around the lamina, serrulate to serrate, ciliate, upper surface green, pilose, lower surface pale, flushed red between the major veins, glabrous, sparsely to densely pilose on the veins, veins palmate but with one primary vein, 6–8 veined from the base, with 1–3 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with up to 3 branches, bearing up to 8 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 40 cm long, green flushed red, glabrous, bracts deciduous, ovate, 7–14 × 4–7 mm, opaque, colour unknown, glabrous, apex obtuse, margin entire, aciliate. *Staminate flowers*: pedicels to 65 mm long, glabrous; tepals 4, spreading, outer 2 obovate to broadly obovate, 15–25 × 12–20 mm, apex rounded, white, sometimes flushed green or pink on the outside, glabrous, margin entire, aciliate, inner 2 obovate, 11–24 × 5–17 mm, apex rounded, white, sometimes flushed green or pink on the outside, glabrous, margin entire, aciliate; stamens 50–75, spreading, yellow, filaments 2.5–5 mm long, fused at the base, anthers broadly obovoid, 1–1.5 × 0.75–1 mm, dehiscing via lateral slits, connectives not extending, symmetrically basifixed. *Pistillate flowers*: pedicels to 31 mm long; bracteoles absent; tepals 5, subequal, deciduous in fruit, spreading, obovate, 5–12 × 4–12 mm, apex rounded, white, sometimes flushed pink or green outside, glabrous, margin entire, aciliate; ovary body ovoid, 4.5–10 × 3–6 mm, pale green flushed pink, glabrous, unequally 3-winged, the largest triangular 7–16 × 5–11 mm, the smallest rib-like, to 1 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, fused at the base, 3–6 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 35 mm long. *Fruit body* ovate, to 15 × 10 mm, drying brown, the wings same shape as in ovary, the largest expanding to 16 × 21 mm, the smallest expanding to 2 mm wide.


**Fig. 68.** *Begonia huancabambae* Moonlight sp. nov. **A**. Habit including inset of upper leaf indumentum. **B**. Fruit, side view, side view. Illustration by Anna Dorward from *A. Ságastegui A.& S. Leiva G. 15307* (US).

**Proposed conservation assessment**

Known from three fragments of highly threatened northwest Peruvian relict montane forest on the western slopes of the Andes. The most distant sites are approximately 220 km apart and none are protected. Given the species low EOO (ca 1200 km$^2$), its few known localities and fragmented distribution, and the threats to its habitat, we assess *B. huancabambae* sp. nov. as Endangered (EN B1ab(iii)).

**Notes**

The holotype of *B. huancabambae* sp. nov. has two staminate flowers with the normal four tepals and ca 75 stamens and a third, aberrant flower with ca 6 flowers and > 100 stamens. The aberrant flower is excluded from our description.

Tebbitt (2017) published an emended description of *B. velata* based upon living plants collected at the type locality (*M.C. Tebbitt & A. Daza 838*). These specimens represent a species superficially similar to the type collection of *B. velata* but differing in several key characters. For example, Tebbitt's collection is rhizomatous (vs tuberous, though this was not known at the time); it has a ring of hairs at the apex of the petiole and scattered, simple hairs across the upper and lower surface of the leaf (vs glabrous petiole and leaves); it has large, persistent stipules (vs inconspicuous and deciduous); it has small (up to 16 × 10 mm), green bracts that do not cover the inflorescence (vs large, up to 28 × 22 mm, white flushed pink bracts, frequently covering the developing inflorescence). Tebbitt's collection instead represented an undescribed species, which we describe herein as *B. huancabambae* sp. nov.

Moonlight *et al.* (2018) also published a sequence made from a plant collected the type locality of *B. velata* and matching Tebbitt's description of *B. velata*. The sequence data they provided in Moonlight *et al.* (2018) is instead the newly described *B. huancabambae*. Tebbitt (2017) discussed that his concept of *B. velata* had a possible hybrid origin from *B. ludwigii* and *B. acerifolia* because of unpublished sequence data (later published in Moonlight *et al.* 2018) and because both species have a ring of hairs around the petiole apex. This speculation is reasonable but should now be applied to *B. huancabambae* sp. nov.

**Identification notes**

Superficially similar to *B. acerifolia* but differing in the outline of its leaves, which are more or less symmetrical with an orbicular outline (vs asymmetrical with an ovate outline). It also has a ring of small trichomes around the apex of its petiole, which is absent in *B. acerifolia*. It is also similar to *B. velata* but has an above-ground rhizome rather than a subterraneous tuber.

**Distribution and ecology**

Endemic to Peru and known from Piura and Cajamarca Regions (Fig. 65D). Found in northwest Peruvian montane forests at an elevation of 1800–3100 m a.s.l.

52. ***Begonia ludwigii*** Irmsch.
Fig. 65B

*Bibliotheca Botanica* 116: 113 (Irmscher 1937). – **Type**: ECUADOR – **Prov. Chimborazo** • valle del río Chanchan, Naranjapata; 530 m a.s.l.; 26 Sep. 1933; *L. Diels 1204*; holotype: B [B100089160, B100089161, photo US].

Smith & Schubert (1952: 38); Smith & Wasshausen (1986: 43); Tebbitt *et al.* (2015: 347); Quintana & León-Yáñez (2011: 199); Esquerre-Ibañez & Tebbitt (2018: 437).

*Begonia compacticaulis* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 612 (Irmscher 1949). – **Type**: ECUADOR – **Prov. Chimborazo** • Huigra; Jul. 1923; *A.S. Hitchcock 20315*; holotype: US [US00115288]; isotype: NY [NY00842224].

Smith & Wasshausen (1979: 244, 1986: 38); Quintana & León-Yáñez (2011: 198); Tebbitt *et al.* (2015: 348).

*Begonia ecuadorensis* auct. non Buxton: hort. ex Everett, *Journal of the New York Botanical Gardens* 41: 4 (Everett 1940).

Tebbitt *et al.* (2015: 348).

*Begonia rigida* auct. non Linden ex Regel: A.Clarke, *The Begonian* 14: 150 (Clarke 1947).

Carrell (1950: 128); Tebbitt *et al.* (2015: 348).

*Begonia griseocaulis* auct. non Irmsch.: L.B.Sm. & B.G.Schub., *Memoirs of the New York Botanical Garden* 8 (1): 38 (Smith & Schubert 1952).

Smith & Wasshausen (1979: 244); Tebbitt *et al.* (2015: 348).

### Etymology

German botanist Ludwig Diels collected the type specimen of the species, which is named in his honour.

### Specimens examined

PERU – **Piura Region: Prov. Huancabamba** • Dist. Huarmaca, entrada a Limón de Porcuya; 5°53′07″ S, 79°32′04″ W; 1541 m a.s.l.; 12 May 2017; *B. Esquerre 156*; HUT. – **Cajamarca Region: Prov. San Miguel** • Dist. La Florida, alrededores de La Florida; 6°53′37″ S, 79°07′08″ W; 1480 m a.s.l.; 28 May 2015; *M.C. Tebbitt & A. Daza 846*; E, MOL. – **Prov. Chota** • Llama; [6°31′ S, 79°07′ W]; 2000 m a.s.l.; 6 Apr. 2012; *L. Garcia Llantas 8591*; USM. – **Lambayeque Region: Prov. Lambayeque** • Dist. Salas, entre Kerguer y Hualanga; 6°11′03″ S, 79°29′57″ W; 1450 m a.s.l.; 12 May 2017; *B. Esquerre 155*; HUT • Dist. Inkawasi, cerca de Moyán; 6°17′25″ S, 79°26′19″ W; 1420 m a.s.l.; 10 Jan. 2018; *B. Esquerre 164*; HUT.

### Description

Caulescent herb, to 100 cm high. *Stem* erect, rarely branching; internodes to 9 cm long, to 12 mm thick, succulent, becoming hardened at maturity, grey-brown, glabrous. *Stipules* deciduous, triangular, 5–12 × 3–7 mm, apex acute, translucent, brown, glabrous, margin entire, aciliate. *Leaves* 1–5 per stem, alternate, basifixed; petiole to 16 cm long, pale green, glabrous but with a ring of squamous hairs at the apex of the petiole; blade sub-symmetric, orbicular in outline, to 29 × 32 cm, succulent, apex acuminate, base cordate, basal lobes not overlapping, sinus to 75 mm deep, margin serrate, with 5–7 irregular, sinuous lobes around the lamina, ciliate, upper surface dark green, glabrous, lower surface pale green, veins white flushed red, glabrous, veins palmate, 5–7 veined from the base. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 3 branches, bearing up to 16 staminate flowers and 16 pistillate flowers, protandrous; peduncle to 25 cm long, pale green, glabrous, bracts deciduous, ovate, 7–10 × 4–5 mm, opaque, white, glabrous, apex acute to obtuse, margin entire, aciliate. *Staminate flowers*: pedicels to 20 mm long, glabrous; tepals 4, spreading, outer 2 broadly ovate, 7–12 × 6–15 mm, apex rounded, white, glabrous, margin entire, aciliate, inner 2 oblanceolate, 8–14 × 3–6 mm, apex rounded, white, glabrous, margin entire, aciliate; stamens ca 50, spreading, yellow, filaments 3–4 mm long, fused at the base, anthers obovoid, ca 0.75 × 0.5 mm long, dehiscing via lateral slits, connectives extending to 0.1 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 20 mm long; bracteoles 2, positioned directly beneath the ovary, ovate, 4–7 × 2–5 mm, apex obtuse, opaque, white, glabrous, margin entire, aciliate; tepals 5, subequal, persistence in fruit, spreading, oblanceolate to broadly ovate, 3.5–9 × 1.5–10 mm, apex obtuse to rounded, white, glabrous, margin entire, aciliate; ovary body obovoid, ca 3.5 × 2.5 mm, white, glabrous, sub-equally 3-winged, wings marginal, 0.5–2 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2–4 mm long, once-divided,

stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 10 mm long. *Fruit body* obovoid, to 9 × 8 mm, drying brown, wings becoming triangular, expanding to 9 × 5 mm.

**Proposed conservation assessment**

Assessed as Vulnerable (VU B2ab(iii)) by Quintana & León-Yáñez (2011), who also assessed its recent synonym *B. compacticaulis* Irmsch. as Vulnerable (VU B1ab(iii)). Esquerre-Ibañez & Tebbitt (2018) were the first to record *B. ludwigii* in Peru and recommended the species retained its Vulnerable status as only one of the species' Peruvian populations is in a protected area. This contradicts the IUCN criteria, as the combined Peruvian and Ecuadorian range of the species has an EOO of ca 28 000 km$^2$ and it is known from more than 10 locations. We reassess *B. ludwigii* as Least Concern (LC).

**Typification notes**

The protologue of *B. ludwigii* cites *L. Diels 1204* held in B as type material (Irmscher 1937: 113). There are two sheets of this collection in B and as they labelled as sheets A (B100089160) and B (B100089161) they can be treated as two separate sheets of the same holotype.

**Identification notes**

*Begonia ludwigii* and *B. huancabambae* sp. nov. are the two only Peruvian *Begonia* species with a ring of squamous hairs at the apex of the petiole and both are relatively large species with thick, succulent stems and lobed leaves. *Begonia ludwigii* can be distinguished from *B. velata* by the prominent petiole scars on its stems and by the irregularly sinuous lobes around its leaf margins (the lobes of *B. velata* are regularly triangular).

**Distribution and ecology**

Known from Ecuador and Peru, and in Peru it has been collected in Piura, Cajamarca, and Lambayeque Regions (Fig. 65A). Found in northwest Peruvian montane forest at an elevation of 1420–1550 m a.s.l. *Begonia ludwigii* most likely drops its leaves in the dry season.

53. ***Begonia monadelpha*** (Klotzsch) A.DC.
Figs 65C, 69

*Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 286 (de Candolle 1864). – *Barya monadelpha* Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 122 (Klotzsch 1854). – **Type**: PERU – **[Huánuco Region: Prov. Huánuco]** • Muña; [9°40′ S, 75°49′ W]; 1785; *H. Ruiz & J.A. Pavón s.n.*; lectotype: B [B100243003, F neg. 20852], **designated here**.

Klotzsch (1855: 143); Walpers (1858: 876); Smith & Schubert (1941a: 194); Brako & Zarucchi (1993: 193); Vásquez *et al.* (2005: 112–125); Wasshausen *et al.* (2014: 385).

*Begonia monadelpha* subsp. *glabriflora* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 73, (Irmscher 1953). – **Type**: PERU – **La Libertad Region: Prov. Pataz** • Valle del río Mixiollo encima de Ongon; [8°12′ S, 76°59′ W]; 2700–2900 m a.s.l.; 3 Aug. 1914; *A. Weberbauer 7035*; lectotype: B [B101068553], **designated here**; isolectotypes: F [3: V0042325F, V0042324F, V0042323F], MOL [3: MOL00002999, MOL000003000, MOL00003001]. **Syn. nov.**

Brako & Zarucchi (1993: 193); León & Monsalve (2006: 167).

*Begonia soror* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 71 (Irmscher 1953). – **Type**: PERU – **Amazonas Region: Prov. Chachapoyas** • zweischen den Tampos Bagazan und Almirante; [6°06′ S, 77°21′ W]; 2700 m a.s.l.; 30 Jun. 1904; *A. Weberbauer 4440*; holotype: B [B100673678]. **Syn. nov.**

Brako & Zarucchi (1993: 195); León & Monsalve (2006: 169).

**Etymology**

The epithet *monadelpha* refers to the androecium of the species, in which the stamens are united into a single column.

**Selected specimens examined**

PERU • 1778–1788; *H. Ruiz & J.A. Pavón s.n.*; G [2]; G-BOIS [2]; G-DC, HAL ex B ex herb. Lamberti [HAL0121709], MA [MA813502]. – **Amazonas Region: Prov. Utcubamba** • Dist. Bagua Grande, Caserío Berlín, Bosque de Berlín; [5°54′ S, 77°26′ W]; 2500–2600 m a.s.l.; 6 May 2005; *E. Rodríguez R., S. Orroya A. & L. Rimarachin C. 2707*; HUT, MO [MO-2217479], US [US00951215], USM. – **Prov. Bongará** • Dist. Yambrasbamba, Conservacion Privada Abra Patricia-Alto Nieva; [5°40′ S, 77°46′ W]; 23 Jul. 2014; *Y.F. Deng et al. 2242*; USM • Dist. Yambrasbamba, Ruta 5N, Alto Mayor; 5°41′ S, 77°47′ W; 2189 m a.s.l.; 25 May 2015; *M.C. Tebbitt & A. Daza 833*; MOL • Road from Amazonas to Rioja; 5°42′01″ S, 77°48′26″ W; 2176 m a.s.l.; 31 Jan. 2016; *P.W. Moonlight & A. Daza 148*; E [E00885458], G, MO [MO-3254792], MOL. – **Prov. Bagua** • Cordillera Colàn SE of La Peca; 2286–2408 m a.s.l.; [5°34′ S, 78°24′ W]; 12 Oct. 1978; *P.J. Barbour 3993*; MO [MO-2180414], USM. – **Prov. Chachapoyas** • South side of Molinopampas-Diosan pass; [6°10′ S, 77°41′ W]; 2700–3200 m a.s.l.; 8 Aug. 1962; *J.J. Wurdack 1627*; F, K, NY, US [2: US00222316, US00222317], USM • Middle and upper slopes of Puma-urco southeast of Chachapoyas; 2500–2700 m a.s.l.; [6°15′ S, 77°41′ W]; 25 May 1962; *J.J. Wurdack 541*; NY, US [2: US00222199, US00222200], USM • Dist. Leymebamba, Alredor de la Laguna de los Cóndores, parte sur; 6°51.20′ S, 77°40.96′ W; 2500–2700 m a.s.l.; 16 Aug. 1998; *V. Quipuscoa S., A. Sagastegui A., S. Leiva G. & M. Bejarano C. 1244*; NY. – **Cajamarca Region: Prov. Chota** • Near Las Palmas, ca 24 km NE of Chota; 6°09′29″ S, 78°35′50″ W; 2034 m a.s.l.; 25 Jul. 2014; *P.W. Moonlight & A. Daza 69*; E [E00724443], MOL, USM • Rejopampa, al O del pueblo de Paccha; [6°25′ S, 78°45′ W]; 2500 m a.s.l.; 21 Jul. 1993; *I. Sánchez V. 6565*; CPUN • La Pauca; [6°22′ S, 78°57′ W]; 2400 m a.s.l.; 22 Jul. 1993; *J.G. Sánchez V. 861*; CPUN. – **Prov. Cutervo** • Parque Nacional de Cutervo, trail from Chorro Blanco to San Andrés de Cutervo; 6°10′ S, 78°45′ W; 2210–2240 m a.s.l.; 15 Sep. 1991; *A.H. Gentry, C. Díaz & R. Ortiz 74830*; MO [MO-098019], USM • Parque Nacional de Cutervo, NW Corner of Cordillera Tarros, Chorro Blanco Sector, ca 10 km W of San Andrés de Cutervo; 6°12′ S, 78°46′ W; ca 2650 m a.s.l.; 4 Nov. 1990; *M.O. Dillon, I. Sánchez, V. & J. Guevara B. 6138*; CPUN, MO [MO-1641384], US [US00424979] • Dist. San Andrés de Cutervo, La Pacarilla; [6°19′ S, 78°48′ W]; 2600 m a.s.l.; 16 Jun. 1980; *J. Cabanillas S. 45*; CPUN. – **Prov. Celendin** • Drainage of río Limon above Cortagana (Chimuch), 30–32 km WNW of Celendin; 6°33′ S, 78°17–18′ W; ca 2400 m a.s.l.; 2 Jul. 1947; *F.R. Fosberg 28089*; L, K, NY, P [P05495341], US [US00222203]. – **Prov. Santa Cruz** • Dist. Pulan, La Peña Blanca; 2600 m a.s.l.; [6°45′ S, 78°53′ W]; 31 Jan. 2008; *L. Santa Cruz 2115*; HUT, USM. – **San Martín Region** • Dist. Huallaga, Valley of río Apisoncho, 30 km above Jucusbamba; 7°55′ S, 77°10′ W; 2100 m a.s.l.; 25 Aug. 1965; *A.C. Hamilton & P.M. Holligan 1420*; K. – **Prov. Mariscal Cáceres** • Forest near Gran Patajen Ruins; ca 7°S, 77°W; 2600 m a.s.l.; 23 Jul. 1953; *K. Young 127?*; HUT. – **Huánuco Region: Prov. Huánuco** • cerros al este del río Huallaga, entre Muña y El Tambo; [9°32′ S, 75°46′ W]; 2400–2500 m a.s.l.; *A. Weberbauer 6714*; MOL [2], NY, US [3: US00222209, US00222201, US00222202] • Along road between Huánuco and Tingo María, vicinity of Carpish Tunnel, 1.1 km N of tunnel, ca km 455; 9°40′ S, 76°04′ W; 2680 m a.s.l.; *T.B. Croat & M. Sizemore 81561*; MO [MO-1642398], US [US00672859], USM • Sariapampa; 9°55′ S, 76°11′ W; 7 May 1946; *F. Woytkowski 294*; G, MO [MO-2264404], US [US00222205], USM. – **Pasco Region: Prov. Oxapampa** • Dist. Huancabamba, Torrebamba; 10°18′24″ S, 75°35′06″ W; 2550 m a.s.l.; 20 May 2004; *R. Rojas, A. Peña & C. Rojas 2410*; HOXA, MO [MO-1101629] • Dist. Huancabamba, Parque Nacional Yanachaga-Chemillén, sector Abra Yanachaga; 10°22′46″ S, 75°27′43″ W; 2900 m a.s.l.; *R. Vásquez, A. Monteagudo, L. Valenzuela, J. Perea & J. Mateo 30447*; HOXA, MO [MO-1664177], US

[US00900530] • Dist. Chontabamba, La Suiza; 10°40′15″ S, 75°30′48″ W; 2327 m a.s.l.; 5 Aug. 2009; *R. Vásquez, A. Peña, R. Rivera & J. Bottger 36239*; HOXA, MO [2: MO-3009202, MO-3009293], USM. – **Cusco Region: [Prov. Paucartambo]** • Near río Yanamayo, below Pillahuata; [13°09′ S, 71°35′ W]; 2000–2300 m a.s.l.; 4–5 May 1925; *F.W. Pennell 14050*; F, NY.

**Description**

Caulescent herb, to 4 m high. *Stem* erect at first but soon scandent, branching; internodes to 6 cm long, to 14 mm thick, woody to succulent, pale green to brown or red, sparsely to densely pilose or rarely glabrous. *Stipules* deciduous, lanceolate, 12–15 × 4–6 mm, apex acute, opaque, pale green to red, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 3.5–15 cm long, pale green to red, sparsely to densely pilose; blade asymmetrical, ovate in outline, to 15 × 10 cm, succulent, apex acute, base cordate, basal lobes not overlapping or rarely overlapping, sinus to 3 mm deep, margin with 1–4 triangular lobes on the broad side of the lamina and 0–2 lobes on the narrow side of the lamina, denticulate to double dentate, ciliate, upper surface bright to dark green, young leaves often iridescent blue and with silver patches along the major veins, sparsely to densely pilose, lower surface pale green to red, pilose, densely pilose on the major veins, veins palmate but with 1 major vein, 4–6 veined from the base, with 1–4 secondary veins on the larger side, 1–3 on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 4–6 branches, bearing up to 128 staminate flowers and 56 pistillate flowers, protandrous; peduncle to 19 cm long, pale green to red, pilose, bracts deciduous, oblanceolate, 3–8 × 1–2 mm, translucent, pale red-brown, glabrous to pilose, apex acute to rounded or truncate, margin entire, aciliate. *Staminate flowers*: pedicels to 25 mm long, glabrous to pilose; tepals 4, projecting, subequal, narrowly-lanceolate, 10–20 × 3–8 mm, apex acuminate, bright red, glabrous, sometimes pilose on the outer surface, margin entire, aciliate; stamens 20–30, spreading, yellow, filaments 1–1.5 mm long, fused into a 5 to 20 mm long column and arising in a spiral from this, anthers elliptic to oblong, 0.5–1 × 0.5 mm long, dehiscing via short, lateral slits, connectives extending 0.2–0.4 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 60 mm long; bracteoles lacking; tepals 5, subequal, deciduous in fruit, projecting, lanceolate, 14–25 × 3–12 mm, apex acute, bright red, glabrous, margin entire, aciliate or rarely ciliate at the base; ovary body ovoid, 4–8 × 2–6 mm, bright red, glabrous to pilose, unequally 3-winged, the largest wing triangular, 4–10 × 1–2 mm, the smallest 2 marginal, to 1 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 8–10 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 60 mm long. *Fruit body* ovoid, to 10 × 7 mm, drying brown, wings same shape as in ovary, the largest expanding to 10–20 mm.

**Proposed conservation assessment**

Widespread and common across central and northern montane Peru, but rarer in southern Peru. Our current circumscription has an EOO of > 50 000 km$^2$, which includes several national parks and other protected areas. The species is common and conspicuous in disturbed and secondary forest as well as primary forest. We assess *B. monadelpha* as Least Concern (LC), which also replaces the Data Deficient (DD) assessment of *B. monadelpha* subsp. *glabriflora* Irmsch. by León & Monsalve (2006).

**Synonymy notes**

We recognise *B. monadelpha* as a widespread species but not one that is particularly variable. It does vary slightly in the relative proportions of the tepals of the staminate flowers to the androecium, the shape of the leaf lobes, and in the density of the hairs on the stem and leaves. Irmscher described *B. soror* Irmsch. to encapsulate specimens with longer androecia than tepals and broader leaf lobes than average, and *B. monadelpha* var. *glabriflora* to include glabrous specimens. Irmscher's taxa each fall at the end of a continuum in variation from *B. monadelpha* so we include them as synonyms of this taxon.

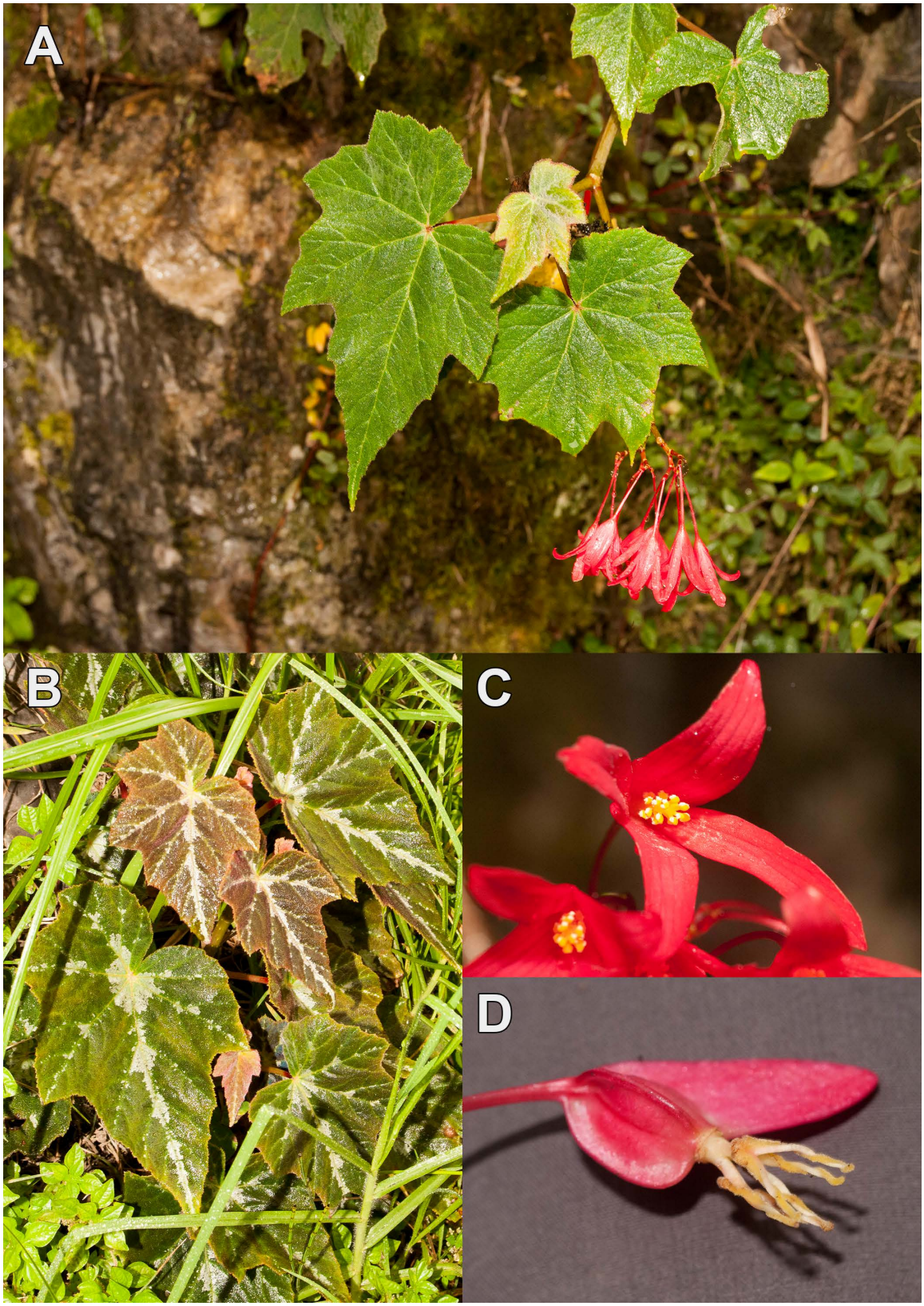


**Fig. 69.** *Begonia monadelpha* (Ruiz ex Klotzsch) A.DC. **A**. Habit. **B**. Habit, immature plant. **C**. Staminate flower, front view. **D**. Immature fruit. All photographs taken by P.W. Moonlight from *P.W. Moonlight 51* (D) in Pasco Province, Oxapampa Region and *148* (A–C) in Bongará Province, Amazonas Region.

**Typification notes**

Past authors have cited the authorship of *B. monadelpha* in two different ways. Smith & Schubert (1941a) cited it as "(Kl.) R. & P. ex A.DC." while later authors (e.g., Golding & Wasshausen 2002) have generally used "Ruiz & Pav ex A.DC". The protologue of *B. monadelpha* cites *Barya monadelpha* Ruiz ex Klotzsch in synonymy (de Candolle 1864: 286), so this constitutes the basionym for *B. monadelpha*. The correct author citation is therefore "(Ruiz ex Klotzsch) A.DC." The protologue of *Barya monadelpha* Ruiz ex Klotzsch cited specimens in "Herb. Ruizii" collected in Peru (Klotzsch 1854: 122). A single sheet in Berlin herbarium collected by Ruiz and Pavón (B100243003) has "Ruiz" on the label and "*Barya monadelpha* Kl." written later in Klotzsch's handwriting. It is also the only specimen of *B. monadelpha* collected by Ruiz and Pavón with a label that unambiguously states it was collected in Muña. A work by Klotzsch (1855) states that the material he saw of this species was from this locality. We therefore designate this sheet as the lectotype of *Barya monadelpha*.

Irmscher cited material of the collection *A. Weberbauer 7035* held in Berlin and Chicago in the protologue of *B. monadelpha* subsp. *glabriflora* (Irmscher 1953: 73). There are three sheets of this collection held in Chicago, but the superior collection is held in Berlin (B101068553) as it includes staminate flowers, pistillate flowers, and fruits. We therefore designate this specimen as the lectotype of *B. monadelpha* subsp. *glabriflora* herein. We also note that there are three excellent duplicates of this collection held at the Weberbauer herbarium in Universidad La Molina in Lima (MOL).

**Identification notes**

In flower, *B. monadelpha* is trivial to recognise as the only caulescent Peruvian species with bright red, projecting staminate tepals with an acuminate apex and stamens united into a long column. Sterile and immature individuals may be confused with other, lobed-leaved members of the acerifolia group of *B.* sect. *Knesebeckia*, especially *B. acerifolia* or *B. arrogans*. Neither of these species however share the scrambling habit of *B. monadelpha*, which usually climbs through dense vegetation. The three species also differ in their stem bases: *B. acerifolia* has a thickened rhizome at the base of the stem, the stem of *B. wollnyi* is thickened and appears woody, and the stem of *B. monadelpha* is equally succulent from the apex to the base of the plant.

**Distribution and ecology**

Endemic to Peru, though a photograph from an unknown locality in Southern Ecuador appears to show this species, and known from Amazonas, Cajamarca, San Martín, Huánuco, Pasco, and Cusco Regions (Fig. 65C). Found in northwest Peruvian relict montane forest, upper and middle montane forest at an elevation of 1800–3400 m a.s.l. *Begonia monadelpha* has been collected as an epiphyte or terrestrial herb and usually scrambles through dense vegetation to 4 m or more. The bright red flowers with projecting tepals suggest the species is hummingbird pollinated though no observations have been recorded and there is no nectar reward.

54. ***Begonia serotina*** A.DC.
Fig. 65C

*Annales des Sciences Naturelles Botanique, Série 4* 11: 121 (de Candolle 1859). – **Type**: ECUADOR – **Prov. Guayaquil: Cerro of Santana** • [2°11′ S, 79°53′ W]; May 1846; *W. Jameson 594*; lectotype: K [K000536583], designated by Smith & Wasshausen (1986: 42); isolectotypes: BM [BM000832009], G, G-BOIS [F neg. 8519], G-DC ex G-BOIS, G-DC ex herb. Peterop. [2], MO [MO-313009], OXF [OXF00068960], TCD [TCD0005557].

de Candolle (1864: 285); Smith & Schubert (1952: 40); Smith & Wasshausen (1979: 244, 1986, 42); Quintana & León-Yáñez (2011: 200); Tebbitt *et al.* (2015: 347).

*Begonia parmata* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 611 (Irmscher 1949). – **Type**: ECUADOR – **[Prov. Guayas]** • Tal des río Chanchan, bei Naranjapata; [2°13′ S, 79°25′ W]; 25 Sep. 1933; *L. Diels 1213*; holotype: B [B100243088].

Irmscher (1953: 90); Smith & Wasshausen (1979: 244); Tebbitt *et al.* (2015: 347).

*Begonia asympeltata* L.B.Sm. & Wassh., *Phytologia* 44: 244 (Smith & Wasshausen 1979). – **Type**: ECUADOR – **Prov. Los Ríos** • Hacienda Clementina; [1°22′ S, 79°52′ W]; 27 Jan. 1947; *G. Harling 201*; holotype: S [S-04-711].

Smith & Wasshausen (1986: 40); Tebbitt *et al.* (2015: 347).

### Etymology

The epithet derives from the Latin '*serotinus*', meaning 'late coming'. This term can apply to any part of the plant and it is unclear to which Alphonse de Candolle was referring. Given that the plant is deciduous, he may however have been referring to the late arrival of the species' leaves.

### Specimen examined

PERU – **Tumbes Region: Prov. Zarumilla** • Entre P.C. "El Caucho" y P.C. "Campoverde", bosque Nacional de Tumbes, reserva de Biósfera del Norveste; 3°50′29″ S, 80°15′33″ W; 720 m a.s.l.; *C. Díaz, H. Horna & E. Peña 4708*; F, HUT, MO [MO-2228062], NY, US [US00672879], USM.

### Description

Caulescent, rhizomatous herb, to 50 cm high. *Rhizome* ellipsoid, 5–20 × 0.8–2.5 cm, with 1 growing point. *Stem* horizontal to erect, rarely branching; internodes to 20 cm long, to 25 mm thick, appearing woody, brown, glabrous. *Stipules* persistent, ovate, 11–13 × 4–8 mm, apex acute, apiculate, pale green, glabrous, margin entire, aciliate. *Leaves* 1–5, alternate, peltate; petiole 5–40 cm long, pale green, glabrous to puberulent; blade subsymmetric, ovate to orbicular, to 19 × 20.5 cm, succulent, apex short-acuminate, base rounded, occasionally cordate, margin denticulate to dentate, ciliate, upper surface dark green, sometimes flushed dark green or purple between the veins, glabrous to sparsely pubescent, lower surface pale green, glabrous to sparsely pubescent, veins peltate but with one primary vein, 8–10 veined from the base, with 2–4 secondary veins on the larger side, 2–4 secondary veins on the smaller side. *Inflorescences* 1–4, bisexual, axillary, erect, cymose, with up to 6 branches, bearing up to 16 staminate flowers and 16 pistillate flowers, protandrous; peduncle to 52 cm long, green, glabrous, bracts deciduous, narrowly elliptic to ovate, 1–5(–12) × 0.75–3(–7) mm, translucent, white, glabrous, apex subacute, margin entire, aciliate. *Staminate flowers*: pedicels to 14 mm long, glabrous; tepals 4, spreading, outer 2 elliptic to ovate, 6–14 × 4–6.5 mm, apex obtuse, white, glabrous, margin entire, aciliate, inner 2 oblanceolate, 4.5–8 × 2–4.5 mm, apex obtuse, white, glabrous, margin entire, aciliate; stamens 35–60, spreading, yellow, filaments 1–2 mm long, fused at the base, anthers ovoid, 0.5–0.75 × 0.5 mm long, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 26 mm long; bracteoles lacking; tepals 5, subequal, persistent in fruit, spreading, narrowly elliptic to ovate, 3.5–7.5 × 1.5–4 mm, apex acute to obtuse, white, glabrous, margin entire, aciliate; ovary body ellipsoid, 6–11 × 4–6 mm, white flushed pink, glabrous, sub-equally 3-winged, wings triangular, largest 1–4 × 7–16 mm; styles 3, yellow, free, 1.5–4 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 25 mm long. *Fruit body* ovoid, to 13 × 10 mm, drying brown, wings same shape as in ovary, the largest expanding to 15 × 21 mm, the smallest expanding to 10 × 21 mm.

### Proposed conservation assessment

Recently assessed as Vulnerable (VU) by Tebbitt *et al.* (2015).

### Typification notes

Tebbitt *et al.* (2015) cited a holotype of *B. serotina* in "G-DEL" herbarium, which was incorporated into the main herbarium in Geneva. However, no holotype exists as no herbaria were cited in the protologue (de Candolle 1859: 121; see McNeill 2014). An earlier citation of a sheet of the type gathering in K herbarium as the holotype (Smith & Wasshausen 1986) constitutes an effective lectotypification of this species. This is a highly appropriate lectotype as it was seen by A.P. de Candolle and is amongst the highest quality of the many duplicates of the type gathering.

### Identification notes

*Begonia serotina* is one of just three Peruvian terrestrial begonias with large (> 10 × 10 cm), peltate leaf laminae. The others are *B. joshii* and *B. urubambensis*, which differ in lacking an aerial stem.

### Distribution and ecology

Known from Ecuador and Peru, and in Peru it has been collected in Tumbes Region (Fig. 65C). Found in dry forests and scrubland at an elevation of 720 m a.s.l., but also known from montane forests in Ecuador. It typically grows in humid and shaded microhabitats, such as moist cliffs.

## 55. ***Begonia wollnyi*** Herzog

Figs 65D, 70

*Repertorium specierum novarum regni vegetabilis* 7: 63 (Herzog 1909). – **Type**: BOLIVIA • Im Bergwald der Quebrada de Cuñucú (Cordillera de Sta. Cruz); ca 800 m a.s.l.; Oct. 1907; *T.C.J. Herzog 86*; lectotype: Z [Z-000001867], **designated here**.

Smith & Wasshausen (1989: 68); Golding (1999: 49); Wasshausen *et al.* (2014: 386); Tebbitt *et al.* (2018a: 218).

*Begonia parodiana* L.B.Sm. & B.G.Schub., *Darwiniana* 5: 88 (Smith & Schubert 1941b). – **Type**: ARGENTINA – **Prov. Salta** • Dept. Oran, Cerros de río Ytau, 54 km west of Manuela Pedraza; [24°30′ S 65°00′ W]; 800 m a.s.l.; 29 Oct. 1939; *W.J. Eyerdam & A.A. Beetle 22726*; holotype: GH [GH00068261, photo US]; isotypes: K, G [G00034152].

Wasshausen *et al.* (2013: 385); Delfini (2017: 8); Tebbitt *et al.* (2018a: 218).

*Begonia acrensis* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 605 (Irmscher 1949). – **Type**: BRAZIL – **Acre State** • río Acre; Jun. 1911; *E. Ule 9649*; lectotype: US [US00115231], designated by Tebbitt *et al.* (2018a: 218); isolectotypes: G, K, U [U0000724].

Golding (1999: 49).

*Begonia williamsii* Rusby & Nash nom. illeg.; later homonym non R.S.Williams, *Torreya* 6: 47 (Rusby & Nash 1906). – **Type**: BOLIVIA • San Buena Ventura; [14°27′ S, 67°33′ W]; 420 m a.s.l.; 14 Nov. 1901; *R.S. Williams 600*; lectotype: NY [NY00118714], designated by Smith & Schubert (1944: 84) isolectotypes: BM [BM000043984], K [K000536789], US [US00115497].

Nash (1916: 57); Smith & Schubert (1955: 114); Golding (1999: 49).

### Etymology

Named for Walter Wollny, who was a German botanist and contemporary of Theodor Carl Julius Herzog, who described the species.

### Specimens examined

PERU – **Cusco Region: Prov. La Convención** • Dist. Camisea, campamento San Martín-C, Camisea Production unit, west of camp; 11°47′08″ S, 72°41′57″ W; 467 m a.s.l.; 13 Jan. 1997; *P. Acevedo R.*

*8682*; CUZ, MO [MO-1835960], NY, US [US00594261], USM • Dist. Echarate, San Martín, 3 well site; 11°46.89′ S, 72°42.10′ W; 400 m a.s.l.; 15 Feb. 1997; *P. Nuñez, S. Baldeón M., A. Alonso, J. Santisteban, G. Valencia, K. Anderson, J. Luton, J. Pacaya V. & F. Ramos R. 19107*; USM.

**Description**

Caulescent herb, to 2 m high. *Stem* erect, becoming hardened at maturity and occasionally resembling a rhizome, rarely branching; internodes to 5 cm long, to 30 mm thick, succulent, pale brown, glabrous. *Stipules* persistent, oblong-ovate to triangular, 8–21 × 3–8 mm, apex acute, setose, opaque, pale green, glabrous, margin entire, aciliate. *Leaves* 3–8 per stem, alternate, basifixed or rarely peltate (never in Peru); petiole 5–16 cm long, green to red, glabrous; blade asymmetric, transversely broad-ovate to suborbicular, to 20 × 26 cm, succulent, apex acute to acuminate, base cordate, basal lobes not overlapping, sinus to 35 mm deep, margin with 4–7 regular triangular lobes spaced evenly around the margin, serrate, ciliate, upper surface green, sometimes flushed silver between the veins, sparsely pilose, lower surface pale green to purple, glabrous to pilose, veins palmate-pinnate, 4–6 veined from the base, with 2–4 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–4 per stem, bisexual, axillary, erect, cymose, with up to 6 branches, bearing up to 16 staminate flowers and 16 pistillate flowers, protandrous; peduncle to 19 cm long, pale green to red, glabrous or minutely glandular pubescent, bracts deciduous, elliptic to oblong, 5–9 × 1.5–5 mm, opaque, green to white, minutely glandular pubescent, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 14 mm long, glabrous; tepals 4, spreading, outer 2 broadly ovate, 5–13 × 7–10 mm, apex rounded, pale green, glabrous to minutely glandular pubescent, margin entire, aciliate, inner 2 elliptic, 5–7 × 2–3 mm, apex rounded, pale green, glabrous, margin entire, aciliate; stamens 75–100, spreading, yellow, filaments 1.25–2 mm long, free, anthers obovoid, 0.5–0.75 × 0.3 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles 2 or lacking, directly beneath the ovary, elliptic, ca 3 × 1 mm, opaque, white, glabrous, apex acute, margin entire, aciliate; tepals 5, subequal, deciduous in fruit, spreading, elliptic to ovate, 5–9 × 2–6 mm, apex acute, pale green, glabrous, margin entire, aciliate; ovary body ellipsoid, 4–10 × 3–7 mm, pale green flushed pink, glandular-pubescent, unequally 3-winged, wings semi-circular to triangular, largest 2–9 × 8–12 mm, smallest 1–7 × 8–21 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 3–3.5 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 30 mm long. *Fruit body* ovoid, to 11 × 8 mm, drying brown, wings same shape as in ovary, the largest expanding to 15 × 18 mm, the smallest expanding to 12 × 18 mm.

**Proposed conservation assessment**

Assessed by Tebbitt *et al.* (2018a) as Least Concern (LC).

**Synonymy notes**

The synonyms of *B. wollnyi* and the typification of *B. acrensis* Irmsch. and *B. parodiana* L.B.Sm. & B.G.Schub. are discussed in detail in Tebbitt *et al.* (2018a).

**Typification notes**

The protologue of *B. wollnyi* does not cite an herbarium thus it is appropriate to designate a lectotype. Tebbitt *et al.* (2018a) treated a sheet of the type collection held in Z as a holotype and we are not aware of any other duplicates of this specimen. We designate this sheet as the lectotype collection herein. Tebbitt *et al.* (2018a) also attempted to designate a lectotype for *B. williamsii* Rusby & Nash. They chose *R.S. Williams 600* (NY), unaware that this sheet had already been designated as the lectotype of this name. Smith & Schubert (1944) cited this sheet as the "type", which prior to 2001 this was sufficient to be considered lectotypification. We therefore consider this the date of lectotypification.


**Fig. 70.** *Begonia wollnyi* Herzog. **1**. Habit. **2**. Leaf. **3**. Staminate flower, front view. **4**. Androecium, side view. **5**–**7**. Stamens, side view. **8**. Pistillate flower, side view. **9**. Cross section of ovary, side view. **10**–**11**. Style, front and back view. **12**. Cross section of ovary. Reproduction of an illustration of *Begonia williamsii* Rusby & Nash by an unknown artist reproduced from Nash (1916: pl. 29) at the Royal Botanic Garden Edinburgh.

**Identification notes**

Most similar to *B. arrogans* (see Identification notes for *B. arrogans*). It is also possible to confuse *B. wollnyi* with *B. acerifolia*. Populations of *B. acerifolia* overlap with those of *B. wollnyi* in the south of Peru and Bolivia. Individuals in these populations of *B. acerifolia* almost always has peltate leaves, whereas those of *B. wollnyi* are basifixed. Furthermore, two of the three wings on the ovaries and fruits of *B. acerifolia* are reduced to ridges whereas those of *B. wollnyi* have three well-developed wings.

**Distribution and ecology**

Known from Peru, Venezuela, and Brazil, where it has a peri-Amazonian distribution. Within Peru, known from a single population in Cusco Region (Fig. 65D). Found in Amazonian forest at an altitude of 400–467 m a.s.l. *Begonia wollnyi* drops its leaves and usually flowers in the dry season.

### *The maynensis group of Begonia sect. Knesebeckia*

The maynensis group of *B.* sect. *Knesebeckia* was revised and informally named by Moonlight *et al.* (2017b). It includes four species within *B.* sect. *Knesebeckia* that are distinguished by their simple, unlobed leaves that are clustered towards the apex of the stem and their conspicuous, relatively persistent stipules. This concept of the group is mostly Peruvian but includes species also found in Ecuador and Brazil. Recent phylogenetic evidence suggests that the maynensis group is monophyletic, though distantly related to the type species of *B.* sect. *Knesebeckia* (Moonlight *et al.* 2018). The group should not however be elevated to section without a full taxonomic revision and phylogeny covering all members of *B.* sect. *Knesebeckia* sensu Moonlight *et al.* (2018).

Moonlight *et al.* (2017b) did not include three species then only known from Ecuador in the maynensis group: *B. brandbygeana*, *B. oellgaardii* L.B.Sm. & Wassh., and *B. sparreana* L.B.Sm. & Wassh. These species differ from the maynensis group sensu *stricto* in their membranaceous leaves and in having non-glabrous leaves. In hindsight, these species should have been revised in Moonlight *et al.* (2017b) as they are almost certainly the group's closest relatives. These species have not yet been included in any molecular phylogenies, so their placement remains uncertain. While *B. brandbygeana* is now recorded from Peru, we refrain from including it or the two Ecuadorian endemics in the maynensis group here because this is a floristic and not a sectional revision.

56. ***Begonia albomaculata*** C.DC.
Figs 7E, 71A, 72

*Boletim do Museo Goeldi de Historia Natural e Ethnographia, Belem* 4: 593 (de Candolle 1906). – **Type**: PERU – **Loreto Region** • Colinas in the Pampa del Sacramento between the río Ucayali and río Huallaga; [8°00′ S, 76°50′ W]; 26 Nov. 1898; *J.E. Huber 1518*; lectotype: G, designated by Moonlight *et al.* (2017a: 181); isolectotype: MG [MG001518].

Brako & Zarucchi (1993: 191).

*Begonia mayasiana* L.B.Sm. & B.G.Schub., *Publicaciones del Museo de Historia Natural Javier Prado, Serie B, Botánica* 17: 7, pl. 3 (Smith & Schubert 1964). – **Type**: PERU – **Amazonas Region: Prov. Bagua** • rainforest along Quebrada Mirana (above Km. 227 of Marañón road), valley of río Marañón above Cascadas de Mayasi; [5°18′ S, 78°25′ W]; 450–500 m a.s.l.; 8 Sep. 1962; *J.J. Wurdack 1902*; holotype: US [US00115384]; isotypes: A [A00068252], K [K000536780], F [V0042322F], NY [NY00118629], S [S04-748], UC [UC1289796], USM [USM000211].

Brako & Zarucchi (1993: 193); León & Monsalve (2006: 167); Moonlight *et al.* (2017b: 181).

*Begonia obtecticaulis* Irmsch. pro parte in Brako & Zarucchi, *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: 194 (Brako & Zarucchi 1993).

*Begonia obtecticaulis* Irmsch. pro parte in León & Monsalve, *Revista Peruana de Biología* 13 (2): 167 (León & Monsalve 2006).

### Etymology

The species is named for the small white flecks that occur on the upper side of the leaves of some populations.

### Selected specimens examined

PERU – **Amazonas Region: Prov. Bagua** • Dist. Imaza, río Cenepa Region, región nor oriental del Marañón, comunidad Samaria; 4°51′ S, 78°08′ W; 300 m a.s.l.; Jan. 1995; *V. Hodges & J. Gorham 235*; MO [MO-286144] • Dist. Aramango, road from Bagua towards Santa María del Nieva, ca 30 minutes by car N. of El Muyo; 5°17′ S, 78°25′ W; 420 m a.s.l.; 30 Jan. 2016; *P.W. Moonlight & A. Daza 126*; E [E00885564], MOL • ca 1 km NE of Quebrada Chinganza (0 km NE of Mayo) on bank of río Marañón; 05°25′ S, 78°28′ W; 450 m a.s.l.; 11 Jun. 1986; *S. Knapp & P. Alcorn 7724*; MO [MO-1643518], USM. – **Loreto Region: Prov. Coronel Portillo** • Boquerón; [9°04′ S, 75°41′ W]; 460–480 m a.s.l.; 8 Nov. 1964; *R. Ferreyra 16068*; MO [MO-1642401], USM. – **San Martín Region: Prov. Moyobamba** • Dist. Jepelacio, centro poblado Nuevo San Miguel, subiendo por el río que pasa cerca a la entrada hacia la catarata de Paccha; 6°13′17″ S, 76°55′13″ W; 1237 m a.s.l.; 13 Feb. 2017; *A. Orejuela, M. Cueva & J. Castillo 2783*; E [2: E01053111, E01053112], USM. – **Prov. Lamas** • Dist. Caynarachi, route from Tarapoto to Yurimaguas; 6°22′41″ S, 76°17′03″ W; 421 m a.s.l.; 4 Feb. 2016; *P.W Moonlight & A. Daza 174*; E [E00885591], MOL. – **Prov. San Martín** • Dist. Tarapoto, kilómetro 39-40 entre la vía Tarapoto-Yurimaguas, orilla del río Cashiyaco y bosques alrededor; 6°25′45″ S, 76°15′13″ W; 15 Feb. 2017; *A. Orejuela, M. Cueva & J. Castillo 2799*; USM • Achinamiza, lowland rainforest along río Huallaga; [6°29′ S, 75°54′ W]; 220 m a.s.l.; 15 May 1979; *D.C. Wasshausen & F. Encarnación 1070*;

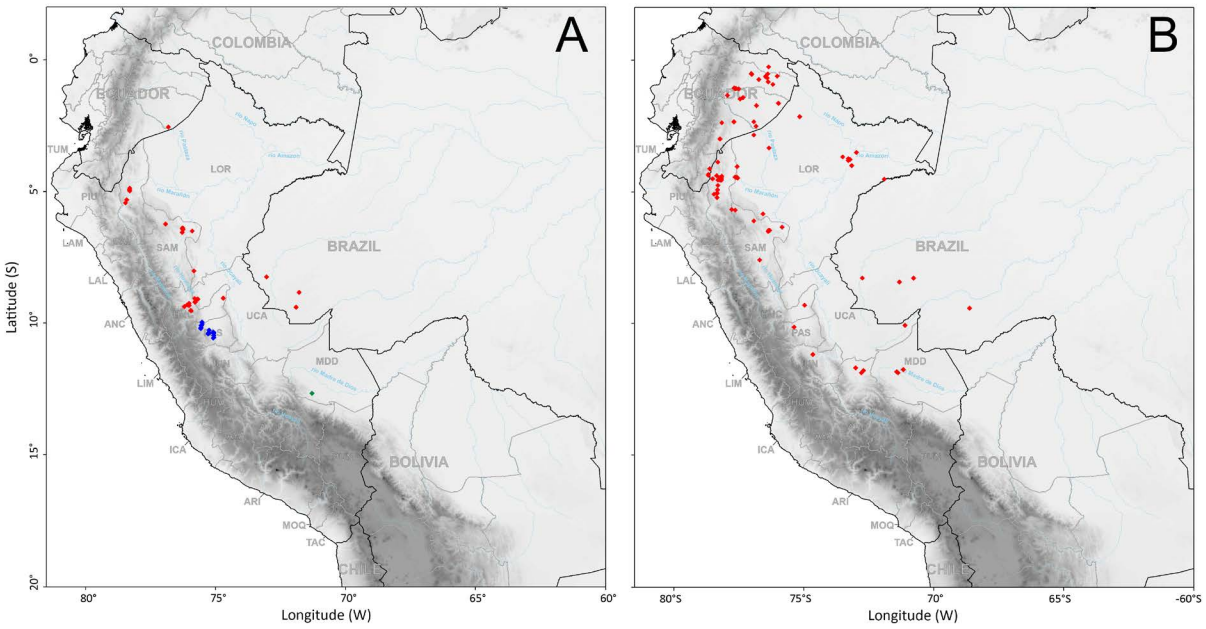


**Fig. 71.** Distribution of the maynensis group of *Begonia* sect. *Knesebeckia* (Klotzsch) A.DC. in Peru and surrounding countries. **A**. *B. albomaculata* C.DC. (red), *B. chemillenensis* Moonlight (blue) and *B. scorpiocaulis* Moonlight & Tebbitt (green). **B**. *B. maynensis* A.DC. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

K, MO [MO-1835963], NY, US [US01286804], USM • Cerro de la Escalera, between Tarapoto and Shapaja; [6°32′ S, 76°17′ W]; 320 m a.s.l.; 1 Feb. 1987; *D.C. Wasshausen & F. Encarnación 1352*; US [US01944379]. – **Huánuco Region** • Huánuco carretera Pucallpa; Aug. 1943; *C.A. Ridoutt 13847*; USM • Along steep cliffs W of río Huallaga above bridge over río Huallaga on road to airport; 09°14′ S, 78°00′ W; 675 m a.s.l.; 5 Apr. 1984; *T.B. Croat 57965*; MO [MO-2154627], USM. – **Prov. Leoncio Prado** • Valley of río Huallaga, along steep banks of río Monzón, near bridge over río Patay Rondos on road from Tingo María to Monzón; 09°17′ S, 76°05′ W; 650 m a.s.l.; 2 Jun. 1998; *T.B. Croat & M. Sizemore 81610*; F, MO [MO-2228055], US [US00672878], USM • Dist. Rupa Rupa, Camino a Jacintillo, (Al oeste de Tingo María); [9°19′ S, 76°01′ W]; 672 m a.s.l.; 2 Nov. 1971, *J. Schunke V. 5107*; COL, G, NY, US [US00222360] • Cayumba entre Huánuco y Tingo María; [9°30′ S, 75°57′ W]; 800–900 m a.s.l.; 15 Jul. 1948; *R. Ferreyra 4224*; MO [MO-1643422], MOL, USM. – **Prov. Huánuco** • Dist. Chinchao, route from Tingo María to Carpish; 9°30′47″ S, 75°56′23″ W; 772 m a.s.l.; 10 Feb. 2016; *P.W. Moonlight & A. Daza 213*; E [E00885563], MOL. – **Prov. Pachitea** • Dist. Honoria, Bosque Nacional de Iparía, region de "bosque seco tropical" a lo largo de rio Pachitea cerca del campamento Miel de Abeja (1 km arriba del pueblo de Tournavista o unos 20 km. Arriba de la confluencia con el rio Ucayali); [9°02′ S, 74°42′ W]; 300–400 m a.s.l.; 26 Oct. 1967; *J. Schunke V. 2279*; NY. – **Ucayali Region: Prov. Padre Abad** • Dist. Padre Abad, Cuenca del río Aguaytía, Quebrada el Velo de la Novia, margen derecha del río Yurmac; 9°03′ S, 75°48′ W; 350–400 m a.s.l.; 30 Jun. 2004; *J. Schunke V. & J.G. Graham 15771*; F [V0088037F], G, MOL • Dist. Padre Abad, ca 2 km N of Boquerón de Padre Abad; 9°04′55″ S, 72°42′59″ W; 478 m a.s.l.; 8 Feb. 2016; *P.W. Moonlight & A. Daza 204*; E [E00885606], MOL • Dist. Padre Abad, Cumbre de la Divisoria, entre Ucayali y Huánuco, cabecera del río Yurac, afluente del río Aguaytía; 9°11′ S, 75°47′ W; 1500–1600 m a.s.l.; 3 Jul. 2007; *J.G. Graham & J. Schunke V. 4156*; MOL, US [US01008609].

**Description**

Caulescent herb, to 60 cm high. *Stem* erect, branching or rarely branching near the base; internodes to 6 cm long, to 8 mm thick, succulent, green, sometimes flushed red, glabrous. *Stipules* persistent, lanceolate, 12–35 × 4–8 mm, apex acuminate, mucronate, translucent, pale green to brown, glabrous, margin entire, aciliate. *Leaves* 2–5, alternate, basifixed; petiole 8–22 cm long, pale green, glabrous; blade asymmetrical, elliptic to ovate, to 30 × 17 cm, succulent, apex acuminate, base rounded on the larger side of the blade, cuneate on the narrow side, basal lobes, margin irregularly dentate, ciliate, upper surface green to dark green, rarely flecked white, glabrous, lower surface pale green to dark red, glabrous, veins palmate-pinnate, 6–9 veined from the base, with 3–5 secondary veins on the larger side, 3–5 secondary veins on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with 3 branches, bearing up to 16 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 8.5 cm long, white to pale green, glabrous, bracts late deciduous, lanceolate, 3–9 × 1–4 mm, translucent, white to pale green, glabrous, apex acute, mucronate, margin entire, aciliate. *Staminate flowers*: pedicels to 20 mm long, glabrous; tepals 4, spreading, outer 2 broadly ovate to orbicular, 7–22 × 4–18 mm, apex obtuse to rounded, white, glabrous, margin entire, aciliate, inner 2 narrowly-oblanceolate, 8–12 × 2–4 mm, apex acute, white, glabrous, margin entire, aciliate; stamens ca 40, spreading, yellow, filaments 1–4 mm long, fused into a 1–2 mm long column, anthers broadly obovoid, ca 0.5 × 0.5 mm, dehiscing via lateral slits, connectives not extending, symmetrically basifixed. *Pistillate flowers*: pedicels to 22 mm long; bracteoles lacking; tepals 5, subequal, deciduous in fruit, spreading, lanceolate to ovate, 4–9 × 3–6 mm, apex obtuse to acute, white, glabrous, margin entire, aciliate; ovary body ellipsoid, 8–15 × 4–8 mm, white to pale green, glabrous, unequally 3-winged, wings triangular, largest 13–18 × 7–15 mm, smallest two 13–18 × 5–8 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 4–6 mm long, once-divided, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 40 mm long. *Fruit body* ellipsoid to ovoid, to 20 × 10 mm, drying brown, wings same shape as in ovary, the largest expanding to 30 × 16 mm, the smallest expanding to 28 × 10 mm.

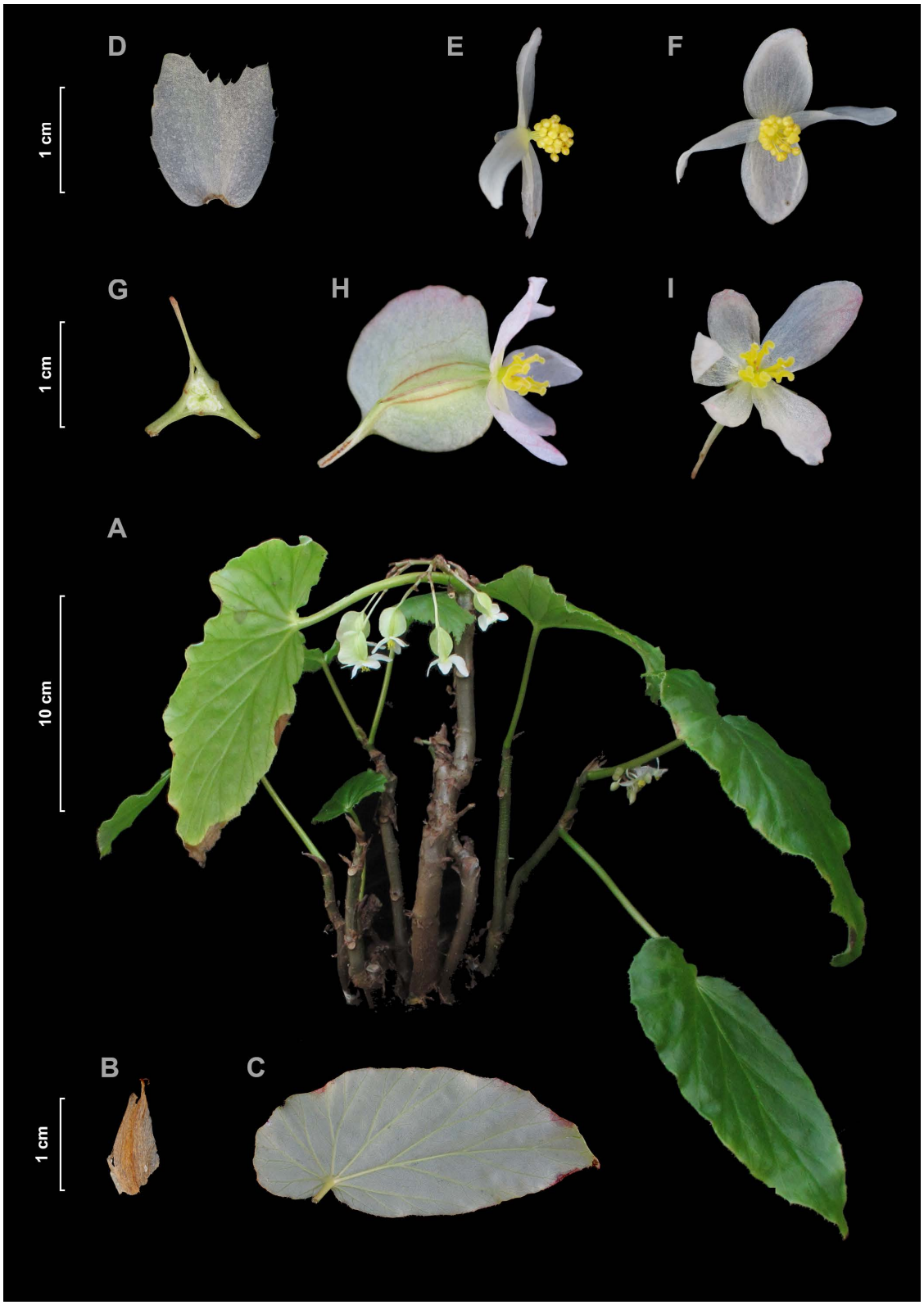


**Fig. 72.** *Begonia albomaculata* C.DC. **A**. Habit. **B**. Stipule. **C**. Leaf, abaxial surface. **D**. Bract. **E**. Staminate flower, side view. **F**. Staminate flower, front view. **G**. Cross section of ovary. **H**. Pistillate flower, side view. **I**. Pistillate flower, front view. All photographs taken by P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh.

### Proposed conservation assessment

Assessed as Least Concern (LC) by Moonlight *et al.* (2017b).

### Identification notes

*Begonia albomaculata* is most like *B. chemillenensis* Moonlight, and flowering individuals can be distinguished by their larger staminate flowers (up to 44 mm across vs up to 24 mm across) with around twice as many stamens (ca 40 vs ca 20). Sterile identification is more difficult but *B. albomaculata* can be distinguished by its generally larger leaves (up to 30 × 17 cm vs up to 25 × 10 cm), which are thicker and more succulent (those of *B. chemillenensis* are membranaceous).

### Distribution and ecology

Known from Ecuador, Peru, and Brazil. Within Peru, it has been collected in Amazonas, Huánuco, Loreto, San Martín, and Ucayali Regions (Fig. 71A). Found in Amazonian and lower montane forest at an elevation of 220–1250 m a.s.l. *Begonia albomaculata* is locally common on rocky slopes by streams in humid forest.

## 57. ***Begonia chemillenensis*** Moonlight

Figs 71A, 73

*Edinburgh Journal of Botany* 74 (2): 185 (Moonlight *et al.* 2017b). – **Type**: PERU – **Pasco Region: Prov. Oxapampa** • Dist. Palcazú, CC NN, Loma Linda; 10°22′ S, 75°04′ W; 430 m a.s.l.; 15 Jun. 2010; *R. Vásquez, M. Huaman & R. Rivera 36606*; holotype: HOXA; isotypes: E [E00912779], MO [MO-2080522], USM.

### Etymology

Named for the Chemillén cordillera at the centre of the species' range.

### Selected specimens examined

PERU – **Huánuco Region: Prov. Puerto Inca** • Dist. Codo de Pozuzo, Route from Pozuzo to Codo de Pozuzo, ca 3.5 km from Puente Paujil; 9°56′50″ S, 75°31′16″ W; 633 m a.s.l.; 20 Feb. 2016; *P.W. Moonlight & A. Daza 283*; E [E00833921], MOL. – **Pasco Region: Prov. Oxapampa** • Dist. Pozuzo, Route from Pozuzo to Codo de Pozuzo; 10°01′05″ S, 75°30′58″ W; 687 m a.s.l.; 20 Feb. 2016; *P.W. Moonlight & A. Daza 287*; E [E00833925], MOL • Dist. Pozuzo, camino to mirador from Pozuzo; 10°04′21″ S, 75°32′57″ W; 781 m a.s.l.; 20 Feb. 2016; *P.W. Moonlight & A. Daza 274*; E [E00833929], MOL • Parque Nacional Yanachaga-Chemillén, Sector Paujil, trail from Pampa Pescado to "las cavernas"; 10°20′32″ S, 75°15′58″ W; 416 m a.s.l.; 25 Feb. 2016; *P.W. Moonlight & A. Daza 317*; E [E00833926], MOL • Dist. Villa Rica, Route from Villa Rica to Puerto Berudez, km. 88; 10°33′10″ S, 75°05′05″ W; 629 m a.s.l.; 24 Feb. 2016; *P.W. Moonlight & A. Daza 313*; E [E00833924], MOL.

### Description

Caulescent herb, to 40 cm high. *Stem* erect, unbranched or rarely branching near the base; internodes to 2.5 cm long, to 5 mm thick, flexuous, pale green, glabrous. *Stipules* persistent, lanceolate, 10–20 × 2–4 mm, apex acuminate, opaque, pale green to brown, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 3–10 cm long, pale green, glabrous; blade asymmetrical, elliptic to oblanceolate, to 25 × 10 cm, succulent, apex acuminate, base broadly rounded on the broad side of the blade, cuneate to rounded or cordate on the narrow side of the blade, margin irregularly dentate, ciliate, upper surface green, glabrous, lower surface pale green, glabrous, veins palmate-pinnate, 6–8 veined from the base, with 3–5 secondary veins on the larger side, 2–4 secondary veins on the smaller

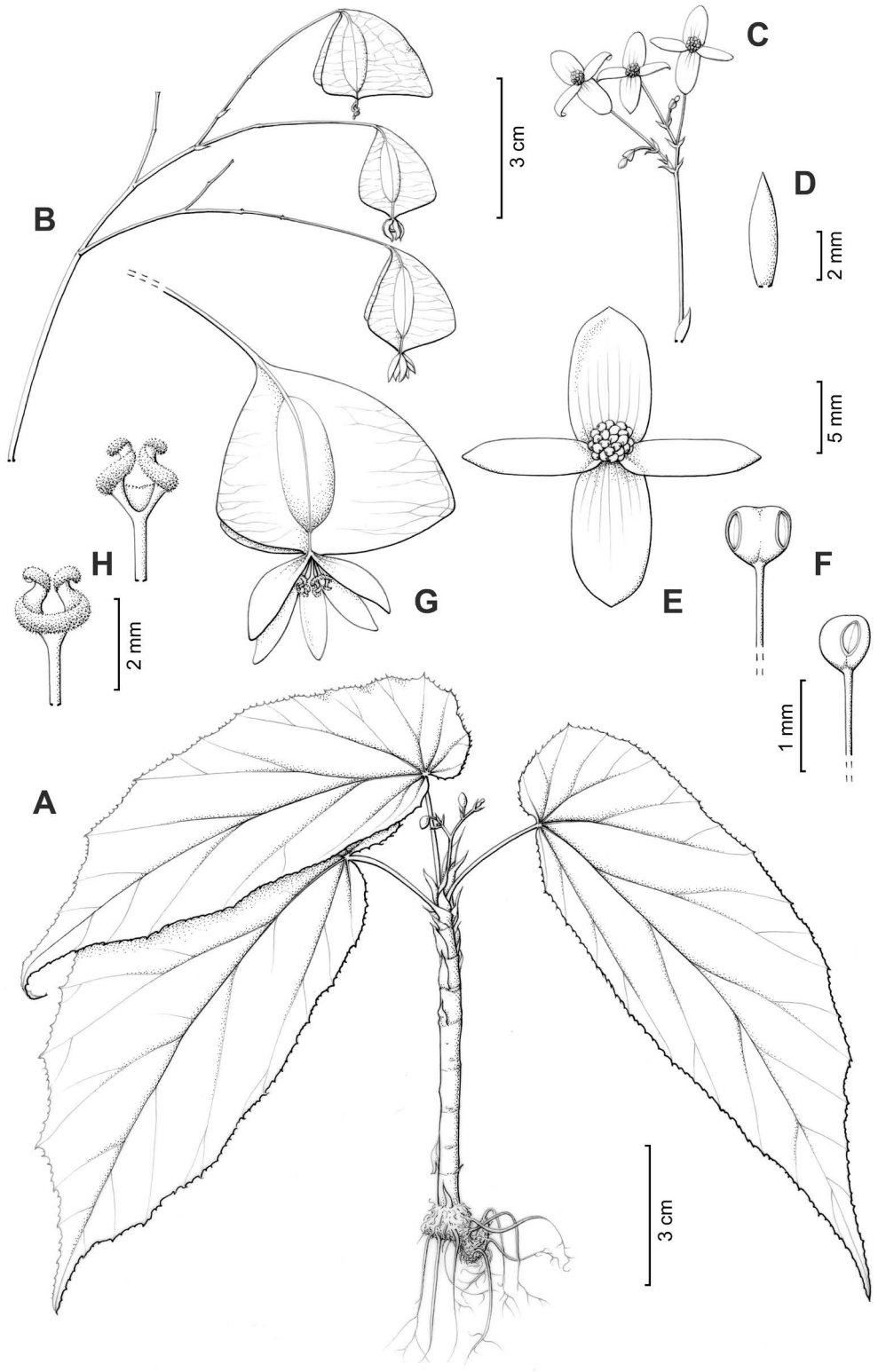


**Fig. 73.** *Begonia chemillenensis* Moonlight. **A**. Habit. **B**. Branch of infructescence. **C**. Branch of inflorescence. **D**. Bract. **E**. Staminate flower, front view view. **F**. Stamens, front and side view. **G**. Pistillate flower, side view. **H**. Style and stigma, front and back view. Illustration by Claire Banks from *I. Huamantupa et al.* 11435 (A), *P.W. Moonlight & A. Daza 287* (B, F, H), and *317* (C, D, E, G). Reproduced from Moonlight *et al.* (2017b), with the permission of *Edinburgh Journal of Botany*.

side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with 5 branches, bearing up to 16 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 12 cm long, pale green to red, glabrous, bracts late deciduous, lanceolate, 5–8 × 1–3 mm, translucent, white, pink, or pale green, glabrous, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 20 mm long, glabrous; tepals 4, spreading, outer 2 lanceolate to narrowly ovate, 7–12 × 2–6 mm, apex acute to obtuse, white, occasionally tinged yellow or orange, glabrous, margin entire, aciliate, inner 2 lanceolate to narrowly ovate, 5–11 × 2–3 mm, apex acute, white, occasionally tinged yellow or orange, glabrous, margin entire, aciliate; stamens ca 20, spreading, yellow, filaments 2–3 mm long, attached along the length of a 1 mm long column, anthers broadly obovoid, 0.25–0.5 × 0.25–0.5 mm long, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles lacking; tepals 5, subequal, deciduous in fruit, spreading, lanceolate to ovate, 7–8 × 4–5 mm, apex acute to obtuse, white, sometimes tinged yellow, orange or pink, glabrous, margin entire, aciliate; ovary body ellipsoid, 10–15 × 4–6 mm, white, glabrous, unequally 3-winged, wings triangular, the largest 15–17 × 5–12 mm, the smallest two 12–15 × 1–5 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2–3 mm long, once-divided, stigmatic papillae in a spirally twisted. *Fruiting pedicel* to 25 mm long. *Fruit body* ellipsoid, to 20 × 9 mm, drying brown, wings same shape as in ovary, the largest expanding to 25 × 15 mm, the smallest expanding to 20 × 12 mm.

**Proposed conservation assessment**

Assessed as Least Concern (LC) by Moonlight *et al.* (2017b).

**Identification notes**

*Begonia chemillenensis* is most similar to *B. albomaculata* (see Identification notes for *B. albomaculata* above) but may also be confused with *B. maynensis*. While *B. chemillenensis* usually has a cuneate leaf base on the narrow side of the leaf blade, it never has a cuneate base on both sides of the blade and is always broadly rounded on the broad side of the blade.

**Distribution and ecology**

Endemic to Peru and known from Huánuco and Pasco Regions (Fig. 71A). Found in Amazonian and lower montane forest at an elevation of 325–1400 m a.s.l. *Begonia chemillenensis* is typically collected on rocky or mud banks adjacent to watercourses but has also been collected from roadside and trailside banks. The species is usually locally common.

### 58. ***Begonia maynensis*** A.DC.
Figs 71B, 74

*Annales des Sciences Naturelles Botanique, Série 4* 11: 126 (de Candolle 1859). – **Type**: PERU – **San Martín Region: [Prov. Tarapoto]** • in andibus Maynensium; [6°27′ S, 76°20′ W]; Aug. 1856; *R.E. Spruce 4859*; lectotype: G-DC [F neg. 7345], designated by Smith & Wasshausen (1979: 246); isolectotype: K [K000006031].

de Candolle (1864: 310); Smith & Schubert (1941a: 194, 1952: 39); Smith & Wasshausen (1979: 246, 1986: 49); Brako & Zarucchi (1993: 193); Vásquez *et al.* (2005: 112–125); Moonlight *et al.* (2017b: 190).

*Begonia longimaculata* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76 (1): 89 (Irmscher 1953). – **Type**: PERU • *W. Lobb s.n.*; holotype: W [W1889-0149133].

Brako & Zarucchi (1993: 193); León & Monsalve (2006: 167); Moonlight *et al.* (2017b: 190).

**Etymology**

The duplicate of *B. maynensis* in G-DC used by Alphonse Pyramus de Candolle to describe the species is labelled as from 'In sylvis humidis andium Maynensibus' (but see Typification notes). The species was named for this locality.

**Specimens examined**

PERU – **Loreto Region: Prov. Maynas** • Alto río Arabela, headwaters of the western tributary of the río Curaray, a Napo tributary ca 70 km SE of the Ecuador border; 2°08′13″ S, 75°08′58″ W; 160–270 m a.s.l.; 28 Aug. 2006; *N. Dávila, R.B. Foster, G. Nuñez, C. Vriesendorp & I. Mesones 2833*; F [V0387176F] • Indiana, Inique, 3°30′ S, 72°58′ W; 115 m a.s.l.; 16 Dec. 1987; *R. Vásquez & N. Jaramillo 10171*; MO [MO-2228056], USM • Mishuyacu, near Iquitos; [4°00′ S, 73°09′ W]; ca 100 m a.s.l.; Feb.–Mar. 1930; *G. Klug 1065*; NY, US [US00222191]. – **Prov. Alto Amazonas** • Puranchim, río Sinchiyacu; 2°50′ S, 76°55′ W; 200 m a.s.l.; 30 Feb.–1 Apr. 1987; *W.H. Lewis, M. Elvin-Lewis, D. Fast & J.R. Campos 13392*; MO [MO-2340409]. – **Prov. Datem del Marañon** • Washintsa and vicinity, río Huallaga; 3°20′ S, 76°20′ W; 320 m a.s.l.; 13–16 Nov. 1986; *W.H. Lewis, M. Elvin-Lewis, J. Campos & D. Fast 11799*; MO [MO-2340416], USM. – **Prov. Alto Amazonas** • Balsapuerto, lower río Huallaga basin; [5°50′ S, 76°34′ W]; 350–550 m a.s.l.; 29 Aug. 1929; *E.P. Killip & A.C. Smith 28476*; NY, US [US0222189] • Dist. Teniente César Lopez Rojas, Shucushuyacu (río Huallaga); 6°02′ S, 75°50′ W; 250 m a.s.l.; 13 Sep. 1981; *R. Vásquez & N. Jaramillo 2452*; MO [MO-2228060], USM. – **Prov. Manseriche** • Pongo de Manseriche; 4°26′01″ S, 77°34′18″ W; 500 m a.s.l.; 28 Nov. 1997; *R. Rojas, N. Peña & M. Correa 706*; HUT, MO [2: MO-1642430, MO-1642431], US [US00672903], USM • Above Pongo de Manseriche; [4°27′ S, 77°35′ W]; 200 m a.s.l.; 21 Nov. 1931; *Y. Mexia* 6130 (BM, G, MO [MO-1642420], NY, U, US [US00222193]. – **Prov. Mariscal Ramón** • Castilla, margen izquierda del río Yavari, entre Colonia Angamos y Lago Preto; 19M 0178075 9500324; 9 Apr. 2003; *H. Beltrán, R.B. Foster, N. Pitman, R. Garcia, C. Vriesendorp & M. Huite 5699*; USM. – **Amazonas Region: Prov. Condorcanqui** • río Cenepa region, quebrada Nahem; 15 Jul. 1974; *R. Kayak 1081*; MO [MO-286165] • río Cenepa region, camino de jutui entsa; [Ajuntaienntsa]; [3°52′ S, 78°18′ W]; 215–245 m a.s.l., 30 Jul. 1984; *R. Kayak 1385*; MO [2: MO-286161, MO-286162], NY • Dist. El Cenepa, Puerto Mori, río Comaina; 4°23′ S, 78°21′ W; 800 m a.s.l.; *R. Vásquez, N. Jaramillo, R. Apanu, R. Apanu & V. Bermeo 18984*; HUT, MO [MO-286173], US [US00672902] • Trail to Sasa, S of Huampami and E of Cenepa; [4°38′ S, 78°12′ W]; 230 m a.s.l., 17 Jul. 1974; *B. Berlin 1717*; MO [MO-286153]. – **Prov. Bagua** • Dist. Imaza, Comunidad Nativa Yamayakat; 300 m a.s.l.; 4°55′ S, 78°19′ W; Jan. 1995, *V. Hodges & J. Gorham 123*; HUT, MO [MO-286158], US [US00672906] • 10 minutes drive S of Chiriaco on main road from Bagua to Santa María de Nieva; 5°12'51′00″ S, 78°20′02″ W; 367 m a.s.l.; 30 Jan. 2016; *P.W. Moonlight & A. Daza 134*; E [E00885572], G, MO, MOL • Dist. Jumbilla, along road Jumbilla-Rioja; 5°39′58″ S, 77°46′19″ W; 1900–1940 m a.s.l.; *H. van der Werff, L. Valenzuela, G. Shareva & A. Reyes Barrantes 25374*; HOXA. – **San Martín Region: Prov. Rioja** • Aguas Verdes; 5°41′17″ S, 77°37′53″ W; 1100 m a.s.l.; 8 Jun. 2012; *H. van der Werff, L. Valenzuela, G. Shareva & A. Reyes B. 25374*; E [E01007289], MO [2: MO-2991759, MO-2991760]. – **Prov. Moyobamba** • Zepelacio; [Jepelacio], near Moyabamba; [6°06′ S, 76°55′ W]; ca 1100 m a.s.l.; Jul. 1934; *G. Klug 3716*; BM, K, MO [MO-1642421], NY, US [US00222172]. – **Prov. San Martín** • An Felsen des Pongo de Chilcayo, Tarapoto; [6°26′ S, 76°16′ W]; Oct. 1902; *E. Ule 6467*; G, K, L • Trail above cataratas de Ahuashiguas on road from Tarapoto to Yurimaguas; 6°27′21″ S, 76°18′30″ W; 761 m a.s.l.; 4 Feb. 2016; *P.W. Moonlight & A. Daza 176*; E [E00885457], G, MOL • Near Tarapoto; [6°28′ S, 76°19′ W]; Jun. 1855; *R.E. Spruce 4859*; BM [BM000777903], E [E00157075], G [G00237559], G-BOIS, G-DC [G00676066], K [K000006032]; MG [MG019634], NY [NY00118630], OXF, TCD [TCD0005563]. – **Prov. Mariscal Cáceres** • Dist. Tocache Nuevo, río Huallaga, margen derecha del, Balsa Probana; Apr. 1982; *S. Barrier s.n.*; US [2: US00222173, US00222174] • Dist. Campanilla, route from Tarapoto to Tocache; 7°35′10″ S, 76°41′30″ W; 467 m a.s.l.; 6 Feb. 2016; *P.W. Moonlight & A. Daza 185*; E [E00885471], MO, MOL. – **Ucayali Region: Prov. Purús** • Cuenca

del río Purús, río Curanja, cerca la communidad nativa de Colombiana; 10°04′ S, 71°06′ W; 300–350 m a.s.l.; 15 Feb. 2000; *J.G. Graham & J. Schunke V. 900*; F [V0088042F], G, US [US01008607]. – **Huánuco Region: Prov. Pachitea** • Puerta Inca, forest along small river just N of town; 9°18′ S, 74°58′ W; 250–300 m a.s.l.; 15 Sep. 1982; *R.B. Foster* 8830 (F, MO [MO-1642433], NY, USM. – **Pasco Region: Prov. Oxapampa** • Comunidad Nativa Alto Lagarto, Reserva Comunal Yanesha; 10°08′04″ S, 75°22′06″ W; 500 m a.s.l.; 28 Mar. 2012; *R. Rojas & G. Ortiz 8195*; E [E01007276], HOXA. – **Junín Region: Dist**. **Satipo** • La Molina University Field Station, ca 10 km N of Satipo on 5S, ca 2 km E of field station; 11°10′08″ S, 74°38′53″ W; 782 m a.s.l.; 8 Jul. 2014; *P.W. Moonlight 65*; E [E00724452], MOL, USM. – **Madre de Dios Region: Prov. Manu** • Cocha Cashu uplands; 11°45′ S, 71°10′ W; 400 m a.s.l.; *P. Núñez 6127*; MO [MO-2228061], US [US00222194] • Parque Nacional del Manu, río Manu, Cocha Cashu Station; 11°50′ S, 71°25′ W; 350 m a.s.l.; 21 Jul. 1984; *R.B. Foster 9668*; F, MO [MO-1642416], NY, USM • ibid.; 11°50′ S, 71°25′ W; ca 400 m a.s.l.; 17 Aug. 1983; *A.H. Gentry 43642*; MO [MO-1642410]. – **Cusco Region: Prov. La Convención** • Dist. Echarati, Pagoreni well site; 11°41′ S, 73°00′ W; 350 m a.s.l.; *P. Nuñez, H. Beltrán, W. Nauray, L. Acurio, R. de la Colina,*

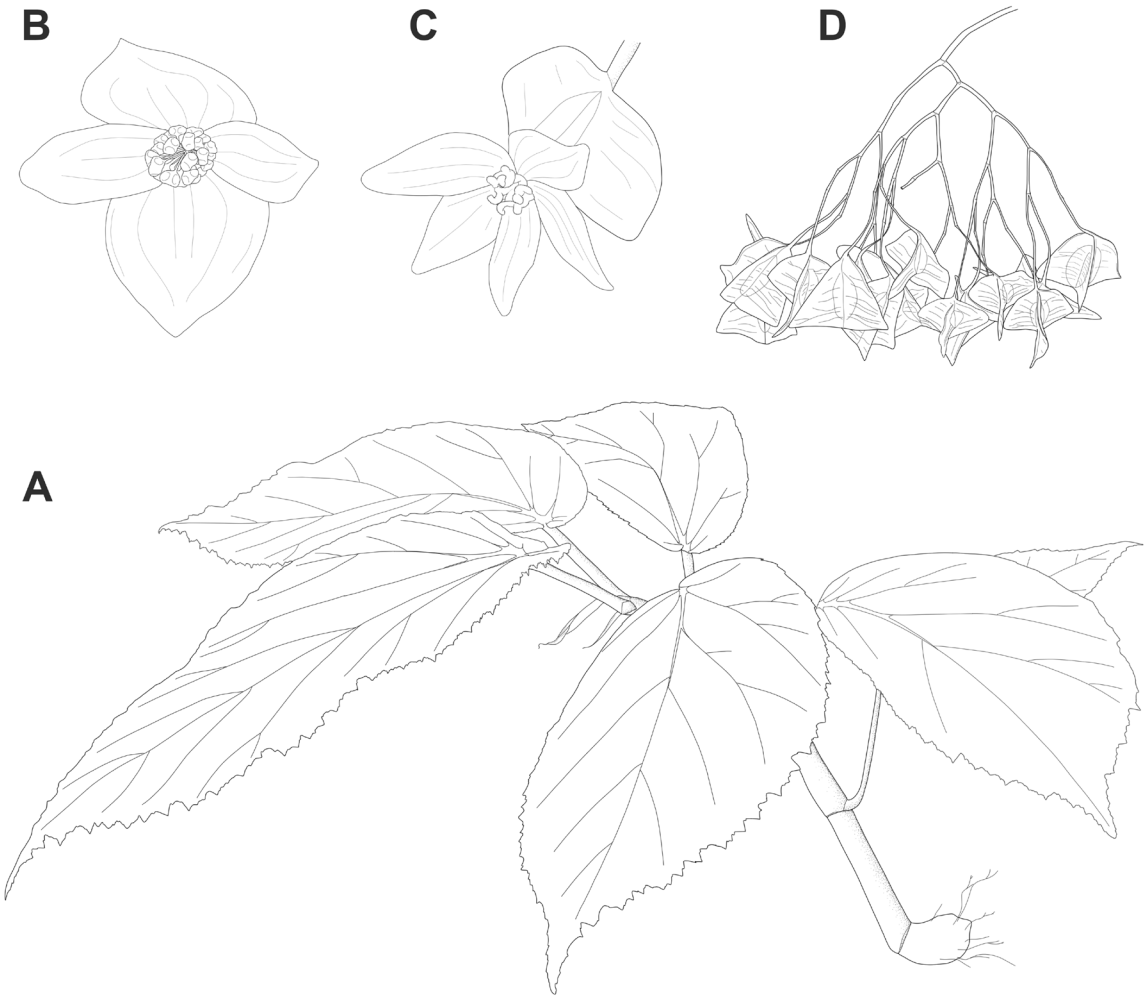


**Fig. 74.** *Begonia maynensis* A.DC. **A**. Habit. **B**. Staminate flower, front view. **C**. Pistillate flower, front-side view. **D**. Branch of infructescence. Illustration by Peter Moonlight from photographs of *P.W. Moonlight & A. Daza 185* (E); all scale bars are estimated.

*N. Llerena & A. Salas 21778*; US [US00625232], USM • Campamento San Martín-C, Camimisaca Production Unit, S and SW of camp; 11°47′08″ S, 72°41′57″ W; 24 Jan. 1997; *P. Acevedo R., D. Bell, K. Rankin & S.F. Smith 9050*; G, K, MO [MO-1642432], NY, US [US00594260], USM • Dist. Echarati, Armihuari well site; 11°51.88′ S, 72°46.69′ W; 535 m a.s.l.; 14 May 1997; *P. Nuñez, H. Beltrán, F. Ramirez, J. Tenteyo P. 20081*; US [US00625231].

**Description**

Caulescent herb, to 40 cm high. *Stem* erect, unbranched or rarely branching at the base; internodes to 3 cm long, to 6 mm thick, flexuous, brown to pale green, glabrous. *Stipules* late deciduous, lanceolate, 10–22 × 4–6 mm, apex acuminate, opaque to translucent, light green to brown, glabrous, margin entire, aciliate. *Leaves* > 3, alternate, basifixed; petiole 0.5–5 cm long, pale green, glabrous; blade subsymmetric, elliptic to oblanceolate, to 22 × 10 cm, succulent, apex acuminate, base obliquely cuneate, margin irregularly dentate, aciliate to sparsely ciliate, upper surface pale to dark green, sometimes with silver blotches between the major veins, glabrous, lower surface pale green to purple, glabrous, veins pinnate, appearing 3 veined from the base, with 6–8 secondary on each side of the lamina. *Inflorescences* 1–5, bisexual, axillary, erect, cymose, with 6 branches, bearing up to 32 staminate flowers and 32 pistillate flowers, protandrous; peduncle to 4.5 cm long, white, glabrous, bracts late deciduous, lanceolate, 3–5 × 1–2 mm, opaque, white, glabrous, apex acute, sometimes mucronate, margin entire, aciliate. *Staminate flowers*: pedicels to 15 mm long, glabrous; tepals 4 spreading, outer 2 lanceolate to ovate, 4–8 × 4–7 mm, apex acute, white, sometimes tinged pink or yellow, glabrous, margin entire, aciliate, inner 2 narrowly lanceolate, 4–6 × 2 mm, apex acute, white, glabrous, margin entire, aciliate; stamens 20–25, spreading, yellow, filaments 1.5–2 mm long, attached along the length of a 2 mm long column, anthers broadly obovoid, ca 0.5 × 0.5 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 10 mm long; bracteoles 1, directly beneath the ovary, lanceolate, 3–5 × 1–2 mm, opaque, white, glabrous, apex acute, sometimes mucronate, margin entire, aciliate; tepals 5, subequal, deciduous in fruit, spreading, lanceolate to ovate, 5–11 × 3–5 mm, apex obtuse to acute, white, sometimes tinged yellow or pink, glabrous, margin entire, aciliate; ovary body ellipsoid, 7–15 × 2–5 mm, white, glabrous, sub-equally 3-winged, wings triangular, 12–20 × 5–10 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 4 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 25 mm long. *Fruit body* ellipsoid to ovoid, to 20 × 8 mm, drying brown, wings same shape as in ovary, expanding to 25 × 15 mm.

**Proposed conservation assessment**

Assessed by Moonlight *et al.* (2017b) as Least Concern (LC).

**Typification notes**

The protologue of *B. maynensis* cited the collection *R.E. Spruce 4859* as the type (de Candolle 1859: 126). Moonlight *et al.* (2017b) attempted to lectotypify the name based upon a collection in G-DC (G00676969). Smith & Wasshausen (1979) had however already cited this sheet as the type of the name. This was the first time the name was lectotypified so should be followed (Turland *et al.* 2018: Article 9.19). It could be argued that Smith & Wasshausen only achieved the first stage of lectotypification as there are two sheets of *R.E. Spruce 4859* at G-DC, but they also cited a photograph of the type at F. There is no photograph of the second G-DC sheet (G00676066) in F so this represents an unambiguous lectotypification. Furthermore, the sheet cited by Smith & Wasshausen (1979) has the following locality description on its label: ‘In sylvis humidis andium Maynensibus’ while the second sheet was collected ‘prope Tarapoto’. The dates on these two collections are also different (Aug. 1856 vs Jun. 1855), so they are clearly two separate collections. There is only one other sheet of *R.E. Spruce 4859* that matches the lectotype locality and date, which is held in Kew (K000006031). We consider this sheet an isolectotype. All other known sheets with this number were collected ‘prope Tarapoto’ in June 1855, so cannot be

considered isolectotypes. De Candolle clearly believed these sheets were also *B. maynensis* because he determined most of them as this species and filed one duplicate as *B. maynensis* in the herbarium of the Prodromus (G-DC, G00676066). We do not consider these sheets collected in 'prope Tarapoto' as syntypes or as isolectotypes.

**Identification notes**

*Begonia maynensis* is the most common terrestrial *Begonia* found in Amazonian and lower montane Peru with cuneate leaf bases and leaves clustered towards the apex of its stems. It is distinguished from *B. buddleiifolia*, which shares these characters, by its smooth and glabrous (vs bullate and glandular haired) leaf laminae.

**Distribution and ecology**

Known from Colombia, Ecuador, Peru, and Acre State in Brazil. Within Peru, known from Loreto, Amazonas, San Martín, Ucayali, Huánuco, Pasco, Junín, Madre de Dios, and Cusco Regions (Fig. 71B). Found in Amazonian Forest, lower and rarely middle montane forest at an elevation of 100–1940 m a.s.l. *Begonia maynensis* is typically collected from riverbanks or rocks in and around small streams but has also been found growing as an epiphyte in very humid forests.

### 59. ***Begonia scorpiocaulis*** Moonlight & Tebbitt
Figs 71A, 75

*Edinburgh Journal of Botany* 74 (2): 185 (Moonlight *et al.* 2017b). – **Type**: PERU • Madre de Dios Region: Pantiacolla, serranía across río alto Madre de Dios from Shintuya; [12°39′ S, 71°17′ W]; 480–840 m a.s.l.; 29 Oct. 1979; *A.H. Gentry, J. Terborgh, J. Aronson & R. Ramirez 27367*; holotype: MO [MO-2154624].

**Etymology**

Named for the contorted stem of the species, which resembles the coiled tail of a scorpion.

**Description**

Caulescent herb, to 20 cm high. *Stem* erect, unbranched; internodes to 2 cm long at the base and progressively shorter towards the apex, to 5 mm thick, succulent, brown, glabrous. *Stipules* tardily deciduous, lanceolate, 4–10 × 2–4 mm, apex acuminate to mucronate, opaque, brown, glabrous, margin entire, aciliate. *Leaves* > 3, alternate, basifixed; petiole 3–4 cm long, colour unknown, glabrous; blade asymmetrical, elliptic to oblanceolate, to 12.5 × 3.5 cm, succulent, apex acuminate, base rounded on the broad side of the lamina, cuneate on the narrow side, margin irregularly dentate, ciliate, upper colour unknown, glabrous, lower surface colour unknown, glabrous, veins palmate-pinnate, with 6–8 veins from the base, with 3–4 secondary veins on the broad side of the lamina, 1–3 on the narrow side. *Inflorescences* at least one per stem, presumed bisexual, axillary, erect, cymose, with up to 4 branches, presumed to bear up to 8 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 6 cm long, colour unknown, glabrous, bracts late deciduous, narrowly-lanceolate, ca 3 × 1 mm, translucent, colour unknown, glabrous, acute, margin denticulate, ciliate. *Staminate flowers*: unknown. *Pistillate flowers*: pedicels to 15 mm long; bracteoles 3, directly beneath the ovary, lanceolate to ovate, ca 5 × 3 mm, translucent, colour known, glabrous, apex acute to obtuse, margin serrate, ciliate; tepals 5, subequal, persistent in fruit, spreading, lanceolate to ovate, 4–7 × 2–3 mm, apex obtuse to rounded, orange, glabrous, margin entire, aciliate; ovary body ellipsoid, ca 6 × 4 mm, colour unknown, glabrous, unequally 3-winged, wings triangular, the largest 7–9 × 10–13 mm, the smallest two 6–8 × 5–6 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 5 mm

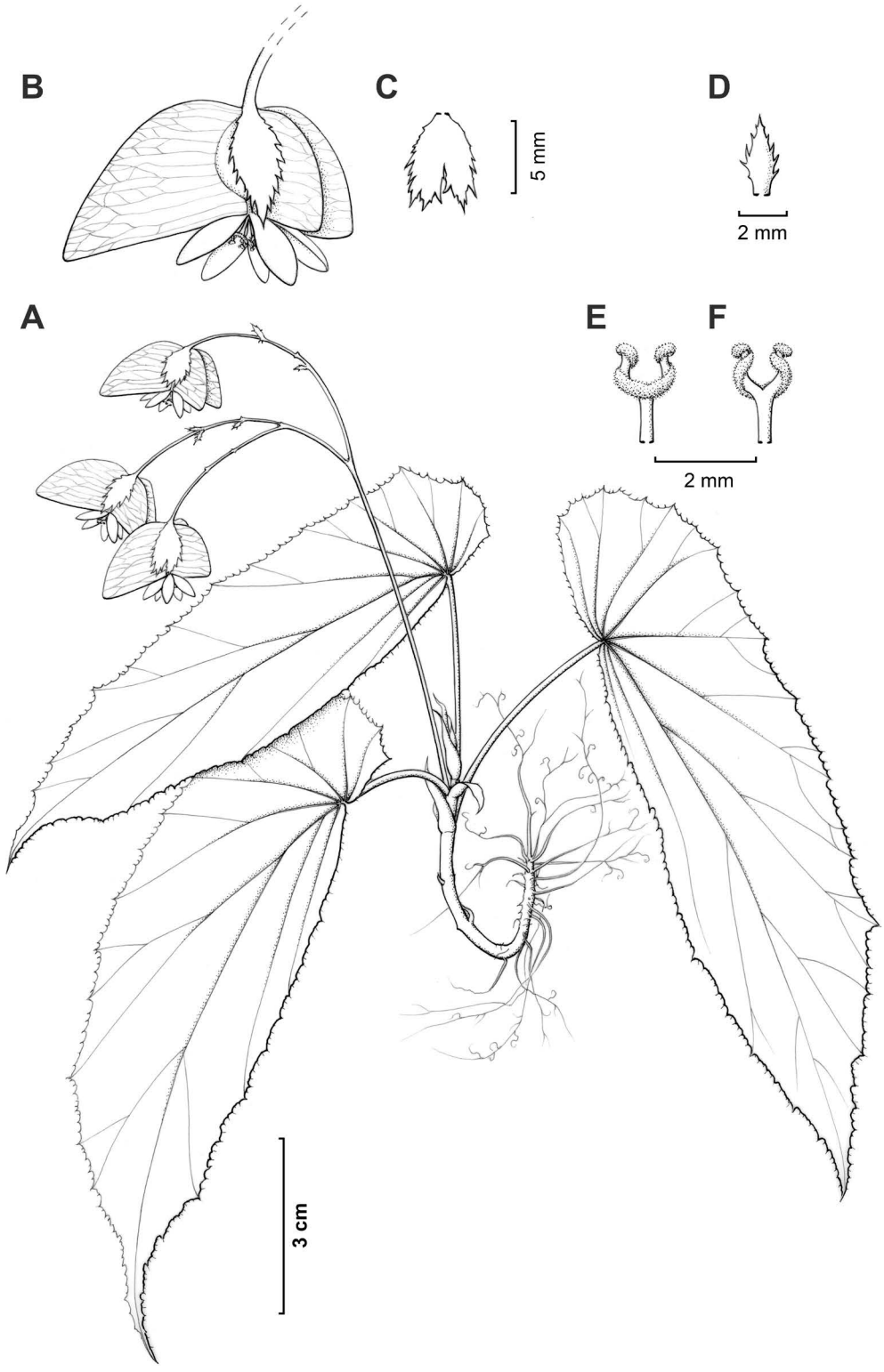


**Fig. 75.** *Begonia scorpiocaulis* Moonlight & Tebbitt. **A**. Habit. **B**. Pistillate flower, side view. **C**. Bracteole. **D**. Bract. **E**. Pistil, front view. **F**. Pistil, back view. Illustration by Claire Banks from *A.H. Gentry 27367* (MO). Reproduced from Moonlight *et al.* (2017b), with the permission of *Edinburgh Journal of Botany*.

long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* unknown. *Fruit* unknown.

**Proposed conservation assessment**

Assessed by Moonlight *et al.* (2017b) as Data Deficient (DD).

**Identification notes**

*Begonia scorpiocaulis* is the only *Begonia* species from Andean South America that has yellow flowers but no tuber.

**Distribution and ecology**

Endemic to Peru and known only from the type collection collected in Madre de Dios Region (Fig. 71A). Found at an altitude of 480–840 m a.s.l. in an area of Amazonian or lower montane forest. *Begonia scorpiocaulis* was collected as an epiphyte, which is surprising as its closest relatives *B. albomaculata*, *B. chemillenensis*, and *B. maynensis* are principally collected as terrestrial herbs.

***Begonia*** sect. ***Lepsia*** (Klotzsch) A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 141 (de Candolle 1859). – *Lepsia* Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 123 (Klotzsch 1854). – **Type**: holotype: *Lepsia microphylla* (Kunth) Klotzsch = *Begonia foliosa* Kunth.

**Synonymy notes**

For a full list of sectional synonyms, see Moonlight *et al.* (2018).

**Notes**

A small section of eight currently recognised species mostly distributed within the northern Andes from Venezuela to central Peru, except for the more broadly distributed *B. guaduensis* Kunth. Its current circumscription was expanded based on phylogenetic evidence by Moonlight *et al.* (2018) to a morphologically homogeneous group of species united by their erect habits; lack of any indumentum, indistinct, pinnate venation; their four tepals on the staminate flower and five on the pistillate flower; and axillary and usually entire placentae.

In Peru, *B.* sect. *Lepsia* is represented by two species and could be confused with any of the other Peruvian sections with pinnate venation, but particularly the glabrous members of *B.* sect. *Ruizopavonia*. They are best distinguished by the number of tepals on their staminate and pistillate flowers, respectively (two and two in Peruvian *B.* sect. *Ruizopavonia*; four and five in *B.* sect. *Lepsia*) or their indistinct (vs prominent) secondary venation.

60. ***Begonia foliosa*** Kunth in Humboldt *et al.* (1825)
Figs 1F, 5D, 7B, 76A, 77

*Nova Genera et Species Plantarum (quarto ed.), vol. 7*: 183 (Humboldt *et al.* 1825). – *Lepsia foliosa* (Kunth) Klotzsch, *Gattungen und Arten* 1854: 182 (Klotzsch 1855). – **Type**: COUNTRY UNKNOWN • Location unknown; *F.W.H.A.v. Humboldt & A.J.A. Bonpland s.n.*; lectotype: P [P00307185], first stage designated by Smith & Schubert (1946c: 191); second stage designated by Smith & Wasshausen (1979: 238); isolectotypes: B [BW17572010], F ex P [V0052628F], P [2: P01900750, P01900751].

Walpers (1858: 899); de Candolle (1864: 375); Smith (1973: 216); Smith & Wasshausen (1986: 12, 1989 : 35); Dorr (1999: 258).

*Begonia elegans* Kunth in Humboldt *et al.* (1825), *Nova Genera et Species Plantarum (quarto ed.), vol. 7*: 182 (Humboldt *et al.* 1825). – *Casparya elegans* (Kunth) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854). – **Type**: COLOMBIA – **[Dept. Cauca]** • Popayán; [12°27′ S, 76°37′ W]; *A.J.A. Bonpland 2082*; lectotype: P [P00307183], **designated here**, first stage designated by Dorr (1999: 258); isolectotypes: P [P01900756, P00307184].

de Candolle (1864: 291); Smith & Schubert (1946c: 196); Smith & Wasshausen (1986: 12).

*Begonia fuchsioides* Hook., *Curtis's Botanical Magazine* 73: t. 4281 (Hooker 1847). – *Tittelbachia fuchsioides* (Hook.) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 126 Klotzsch 1854). – **Type**: lectotype: t. 4281 in Hook., *Curtis's Botanical Magazine* 73: t. 4281 (Hooker 1847), **designated here**.

de Candolle (1864: 291); Smith & Schubert (1946c: 197); Smith & Wasshausen (1989: 36); Dorr (1999: 262).

*Begonia miniata* Planch. & Linden, *Flore des Serres et des Jardins de l'Europe, Sér. I* 8: 105 (Planchon & Linden 1853). – *Begonia fuchsioides* var. *miniata* (Planch. & Linden) A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 291 (de Candolle 1864). – *Begonia fuchsioides* forma. *miniata* (Planch. & Linden) Voss, *Vilmorin's Blumengärtnerei* 1: 360 (Voss 1894). – *Begonia foliosa* var. *miniata* (Planch & Linden) L.B.Sm. & B.G.Schub., *Caldasia* 4 (18): 196 (Smith & Schubert 1946c). – **Type**: lectotype: plate '*Begonia miniata*' in Planch. & Linden, *Flore des Serres et des Jardins de l'Europe, Sér. I* 8: 105 (Planchon & Linden 1853), **designated here**.

Smith & Wasshausen (1989: 36); Brako & Zarucchi (1993: 192); Dorr (1999: 261).

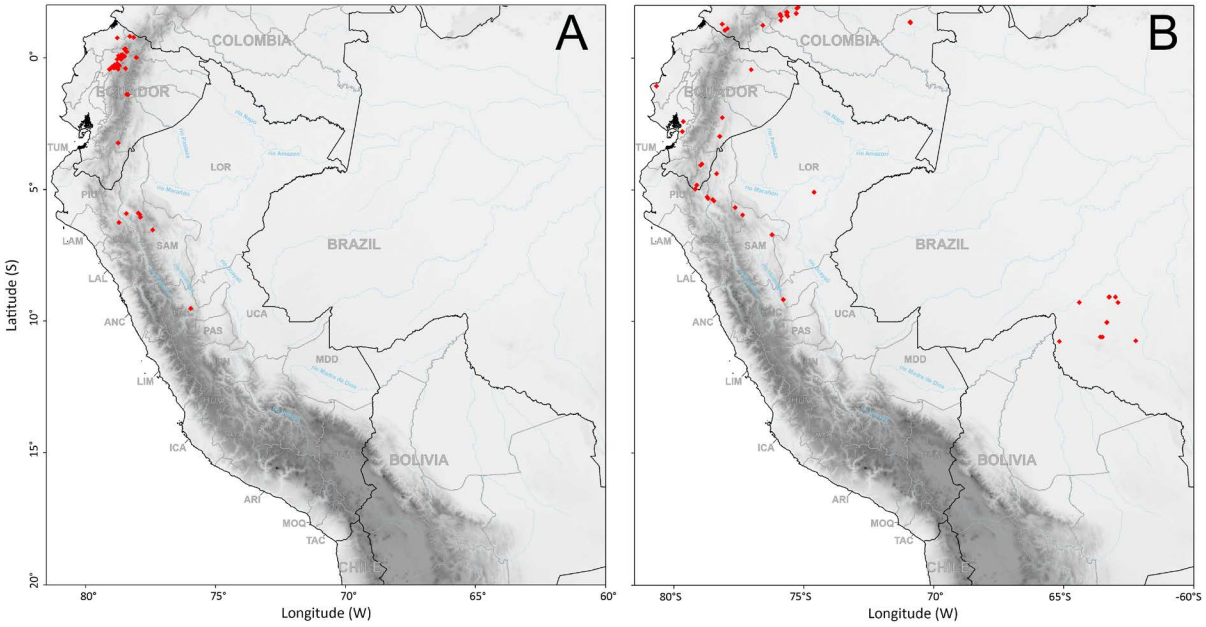


**Fig. 76.** Distribution of *Begonia* sect. *Lepsia* (Klotzsch) A.DC. in Peru and surrounding countries. **A**. *B. foliosa* Kunth (red). **B**. *B. guaduensis* Kunth. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

*Begonia multiflora* Benth., *Plantas Hartwegianas Imprimis Mexicanas* 1845: 185 (Bentham 1845). – **Type**: COLOMBIA – **Dept. Cundinamarca** • near the village of Tena, Prov. Bogotá; [4°39′ N, 74°23′ W]; Sep. 1845; *A. Hartweg s.n.*; holotype: K [K000994431].

Dorr (1999: 261).

*Lepsia microphylla* Klotzsch, *Gattungen und Arten* 1854: 182 (Klotzsch 1855). – *Begonia microphylla* (Klotzsch) A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 375 (de Candolle 1864). – *Begonia foliosa* var. *microphylla* (Klotzsch) Dorr., *Harvard Papers in Botany* 4 (1): 261 (Dorr 1999). – **Type**: VENEZUELA • "in silvis Humidis"; Dec.; *J.W.K. Moritz 1263*; lectotype: B [B100243005], **designated here**, first stage designated by de Candolle (1864: 375); isolectotypes: B [B100243006], BM [BM000832010], BR [BR0000006956646], P [P00482243]).

Walpers (1858: 899); Smith & Schubert (1946c: 188); Smith (1973: 216); Smith & Wasshausen (1989: 37).

*Lepsia poeppigiana* Klotzsch, *Gattungen und Arten* 1854: 247 (Klotzsch 1855). – *Begonia poeppigiana* (Klotzsch) A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 376 (de Candolle 1864). – **Type**: PERU • "Peruv. Subandin.", *E.F. Poeppig s.n.*; lectotype: B [B100243078, F neg. 20823], first stage designated by de Candolle (1864: 376); second stage designated by Dorr (1999: 259); isolectotype: P [P00482230] • ibid.; *E.F. Poeppig 1241*; syntypes: OXF, G-BOIS, G-DC • [Prov. Huánuco]: ad Cuchero; 9°30′ S, 75°56′ W]; *E.F. Poeppig s.n.*; syntype: F [V0042327F].

Walpers (1858: 899); Smith & Schubert (1941a: 198); Smith & Wasshausen (1984: 469).

*Begonia jamesoniana* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 139 (de Candolle 1859). – **Type**: ECUADOR • "ad Quito"; 2440 m a.s.l.; *W. Jameson 305*; lectotype: G-BOIS [F neg. 8516] designated by Dorr (1999: 259); isolectotypes: BM [BM001191432], G, K [K000536733], OXF [OXF00058702, OXF00058703], TCD [TCD0005566].

de Candolle (1864: 376); Smith & Schubert (1946b: 86).

*Begonia putzeysiana* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 139 (de Candolle 1859). – *Begonia foliosa* var. *putzeysiana* (A.DC.) L.B.Sm. & B.G.Schub., *Caldasia* 4 (18): 192 (Smith & Schubert 1946c). – **Type**: VENEZUELA – **Prov. Trujillo** • 1980 m a.s.l.; Apr. 1846; *Funck & Schlim 821*; lectotype: G [F neg. 24205], designated by Dorr (1999: 259).

de Candolle (1864: 375); Smith (1973: 216).

*Begonia foliosa* var. *rotundata* L.B.Sm. & B.G.Schub., *Caldasia* 4 (18): 192 (Smith & Schubert 1946c). – **Type**: COLOMBIA – **Dept. Santander** • vicinity of California, eastern Cordillera; [7°21′ N, 72°57′ W]; 2100 m a.s.l.; 11–27 Jan. 1927; *Killip & A.C. Smith 16761*; holotype: GH [GH00068234]; isotypes: NY [NY00118610], US [US00115315].

Dorr (1999: 259).

*Begonia foliosa* var. *australis* L.B.Sm. & B.G.Schub., *Caldasia* 4 (18): 194 (Smith & Schubert 1946c). – **Type**: COLOMBIA – **Dept. Antioquia** • La Sierra, 18 km N of Medellin; [6°23′ N, 75°35′ W]; ca 2000 m a.s.l.; Jan. 1931; *Archer 1516*; holotype: US [US00115314]; isotype: MEDEL [MEDEL000064].

Smith & Schubert (1950: 86); Brako & Zarucchi (1993: 192); Dorr (1999: 262).

*Begonia microphylla* var. *major* L.B.Sm., *Phytologia* 33 (7): 441 (Smith 1976). – *Begonia foliosa* var. *major* (L.B.Sm.) Dorr, *Harvard Papers in Botany* 4 (1): 260 (Dorr 1999). – **Type**: VENEZUELA – **Lara State** • Dist. Morán, forest along the río Tocuyo, south of Humocaro Alto; 9°33′ N, 70°02′ W; 1300 m a.s.l.; 13 Oct. 1974; holotype: VEN [VEN109268]; isotype: US [US00115395].

Smith & Wasshausen (1989: 38).

*Begonia microphylla* Willd. ex Klotzsch (nom. inval.; nom. rej. pro syn. *Lepsia microphylla* Klotzsch), *Gattungen und Arten* 1854: 182 (Klotzsch 1855).

*Begonia splendens* hort. ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia puyzeysiana* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 375 (de Candolle 1864).

*Begonia foliosa* Poepp. ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia puyzeysiana* A.DC.), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 376 (de Candolle 1864).

### Etymology

The epithet derives from the Latin word '*foliosus*', meaning 'leafy'. This refers to the dense foliage of the species.

### Specimens examined

PERU • *A. Matthews s.n.*; BM. – **Amazonas Region: Prov. Utcubamba** • Dist. Bagua Grande, entre Vista Hermosa y Santa Clara, camino a la reserva Bosque Berlín; 5°53′42″ S, 78°25′56″ W; 2037 m a.s.l.; 5 Feb. 2017; *A. Orejuela, M. Cueva & J. Castillo 2708*; E [E01053106], USM. – **Prov. Bongará** • Dist. Cuispes, trail from Cuispes to Catarata Yumbilla; 5°55′00″ S; 5°55′38″ W; 2231 m a.s.l.; 5 Jul. 2018; *P.W. Moonlight 1271*; USM • Yambrasbamba, 1860–2000 m a.s.l.; [5°45′ S, 77°54′ W]; 2–26 Mar. 1967; *S.S. Tillett 673-293*; US [2: US00222364, US00222365], USM • Lower portion of Shipasbamba-Pomacocha trail; [5°53′ S, 77°58′ W]; 1600–1900 m a.s.l.; 29 Jun. 1962; *J.J. Wurdack 1106*; US [US00222133], USM. – **Prov. Chachapoyas** • *Matthews s.n.*; G, G-BOIS • Viewpoint on trail from Gocta Village to Gocta Falls; 6°01′57″ S, 77°53′35″ W; 2150 m a.s.l.; 2 Jul. 2018; *P.W. Moonlight 1242*; USM. – **Prov. Rodríguez de Mendoza** • Dist. Vista Alegre, entre Vista Alegre y río Salas; 6°10′ S, 77°19′ W; 1470–1525 m a.s.l.; 30 Jun. 1998; *I. Sánchez V., M. Dillon & N. Zapata 9562*[a]; CPUN, F, US [US00673144] • 5 km sureste de Achamal, 6°31.85′ S, 77°24.5′ W; 1400 m a.s.l.; *V. Quipuscoa S., S. Leiva G., Y. Díaz V. & M. Starup J. 1955*; HUT, US [US00689820]. – **Cajamarca Region: Prov. Cutervo** • Ladera entre San Andrés y la ruta a Santo Tomás, a 1 km de San Andrés; [6°14′ S, 78°43′ W]; 2100 m a.s.l.; 12 Oct. 1987; *I. Sánchez V. 4471*; CPUN, MO [MO-2258827]. – **Huánuco Region: Prov. Huánuco** • ad Cuchero; 9°30′ S, 75°56′ W]; *E.F. Poeppig 1241*; G-DC, OXF • Near Riachuelo Chontalagua; [9°31′ S, 75°56′ W]; 815 m a.s.l.; 16 Oct. 1936; *Y. Mexia 8298*; BM, F, G, MO [MO-2258823], NY, U, US [US00222271]. – **Prov. Leoncio Prado** • Vicinity of Tingo María, north side of bridge over río Chinchao on Huánuco-Tingo María road; [9°30′ S, 75°57′ W]; 18 Jul. 1963; *M.E. Mathias & D. Taylor 5905*; K, MO [MO-620235] • Cayumba, Tingo María; [9°30′ S, 75°57′ W]; 15 Mar. 1954; *G.G. Smith & C. Arvalo 307*; MO [2: MO-2603906, MO-2603907].

### Description

Caulescent herb, to 2 m high. *Stem* erect, branching; internodes to 6.5 cm long, to 6 mm thick, succulent, pale green to brown or red, glabrous. *Stipules* late deciduous, triangular, 2.5–9 × 0.5–1.5 mm, apex acuminate, mucronate, translucent, pale green to brown, glabrous, margin entire, aciliate. *Leaves* > 5 per stem, alternate, basifixed; petiole 0.3–0.7 cm long, red, glabrous; blade sub-symmetric, elliptic to oblanceolate, to 3.5 × 1.2 cm, succulent, apex acute to obtuse, base cuneate, margin entire to serrulate or serrate, ciliate, upper surface green, glabrous, lower surface pale green, glabrous, veins pinnate, indistinct, with 2–4 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with up to 6 branches, bearing up to 64 staminate flowers and 32 pistillate flowers, protandrous; peduncle to 3 cm long, green to red, glabrous, bracts deciduous, lanceolate, 1–2.5 × 0.5–1.5 mm, white, translucent, glabrous, apex acuminate, mucronate, margin entire, aciliate. *Staminate flowers*: pedicels to 6 mm long, glabrous; tepals 4, slightly projecting, outer 2 ovate, 3–6 × 2–3 mm, apex obtuse, white flushed pink, glabrous, margin entire, aciliate, inner 2 oblanceolate, 2.5–5 × 1–2 mm, apex rounded, white flushed pink, glabrous, margin entire, aciliate; stamens 30–50, projecting, yellow, filaments 1–3 mm long, fused into an irregularly branching 2–2.5 mm long column, anthers ovoid, ca 0.25–0.5 × 0.5 mm long, dehiscing via lateral slits, connectives extended to 0.1 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 12 mm long; bracteoles 2, positioned directly beneath the ovary, ovate, 2.5–3 × 1.5 mm, apex obtuse, translucent, white, glabrous, margin entire, aciliate; tepals 5, subequal, deciduous in fruit, spreading, ovate, 5–10 × 3–6 mm, apex obtuse, white flushed pink, glabrous, margin entire, aciliate; ovary body ovoid, ca 3 × 2 mm, white flushed pink, glabrous, unequally 3-winged, largest wing triangular 4–5 × 4–5 mm, smallest rib-like ca 0.5 mm wide; 3-locular, placentae branches entire, bearing ovules on both surfaces; styles 3, yellow, free, 2–4 mm


**Fig. 77.** *Begonia foliosa* Kunth. **A**. Habit. **B**. Stipule, adaxial view. **C**. Leaf, abaxial view. **D**. Leaf, adaxial view. **E**. Staminate flower, side view. **F**. Staminate flower, front view. **G**. Largest tepal of the staminate flower. **H**. Smallest tepal of the staminate flower. **I**. Androecium, front view. **J**. Pistillate flower, side view. **K**. Pistillate flower, front view. **L**. Cross section of ovary. **M**. Largest tepal of the pistillate flower. **N**. Smallest tepal of the pistillate flower. **O**. Gynoecium, front view. All photographs taken by P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh (A–I, Accession 20180920a, grown from seeds collected as part of *P.W. Moonlight 1242*; J–O, Accession 19480286d, of unknown origin).

long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 15 mm long. *Fruit body* ovoid, to 9 × 5 mm, drying brown, the largest wing same shape as in ovary, expanding to 12 × 12 mm, the smallest triangular, to 8 × 4 mm, or rib-like, to 2 mm wide.

**Proposed conservation assessment**

While only locally common in Peru, *B. foliosa* is common throughout much of its range. It has an EOO of ca 1 000 000 km$^2$, which includes numerous protected areas. We assess *B. foliosa* as Least Concern (LC).

**Notes**

The label of the specimen *V. Quipuscoa S., S. Leiva G., Y. Díaz V. & M. Starup J. 1955* states it was collected in Saposoa District, Huallaga Province, in San Martín Region. The GPS and locality description on the label both refer to localities in Amazonas Region. We do not know of any specimens of *B. foliosa* collected in San Martín.

**Typification notes**

In the protologue of *B. foliosa*, the author cited material of an unknown origin collected by Humboldt and Bonpland (Humboldt *et al.* 1825: 183). There are three specimens in Paris herbarium (P) that match this description, a single specimen in Berlin (B) and a fragment of one of the Paris specimens in the herbarium of the Field Museum in Chicago (F). Smith & Schubert (1946c) cited the type as in Paris, which constituted an effective first stage lectotypification, ruling out both the Berlin and Chicago specimens as types. The second stage of lectotypification was carried out by Smith & Wasshausen (1979) because they cited material in P that has a photograph in US as the type of *B. foliosa*. There is only a photograph of one of the three P specimens in US, so this constitutes an unambiguous reference to a single specimen so an effective second stage lectotypification.

Kunth described *B. elegans* Kunth from material collected by Humboldt and Bonpland (Humboldt *et al.* 1825: 182), and in this publication a locality was specified as 'La Vega de San Lorenzo, inter Popyan et almaguer' in modern day Colombia. This description matches the collection *A.J.A. Bonpland 2082*, which is represented in P by three collections. Smith & Schubert (1946c) also suggest there is a fragment of the type at F, but we have not seen this material. Dorr (1999) cited a sheet at P with a photograph in US as the holotype of *B. elegans* but also cited a second specimen in P with a photograph at US as an isotype. It is therefore not possible to determine which of these two specimens Dorr considered the lectotype, but as their citation narrowed the type down to two specimens it constitutes an effective first stage lectotypification. We designate one of these two specimens (P00307183) as the lectotype of *B. elegans* and therefore affect the second stage of lectotypification.

Bentham described *B. multiflora* Benth. from material collected by A. Hartweg in Bogotá Province "Juxta pagum Tena" (Bentham 1845: 185). There is a specimen in Kew herbarium that was collected by Hartweg and has a label with an English translation of this locality. This specimen is also labelled as *B. multiflora* and has the citation of the protologue handwritten in Bentham's handwriting. It is clear that the protologue was referring to this specimen so we consider it the holotype of *B. multiflora.*

In the protologue of *B. fuchsioides* Hook., the author cited material collected by Mr. Purdie in the Ocaña mountains of New Granada in modern day Colombia, and material grown by Mr. Veitch in Exeter (Hooker 1847: t. 4281). We have seen no material at Kew collected by Purdie, but there is one collection in Kew herbarium identified as *B. fuchsioides* in J.D. Hooker's handwriting [K000102452]. The only information on the label of this specimen is that it was of cultivated origin. This may have been grown in Veitch's collection thus be a syntype of *B. fuchsioides* but this is unlikely as a stamp shows the sheet did not enter J.D. Hooker's herbarium until 1867, twenty years after the protologue was published. It

is more likely that this specimen was grown in Kew, perhaps from a cutting of Veitch's material. As we cannot find a specimen that was definitively cited in the protologue, we instead designate the illustration in the protologue as the lectotype of *B. fuchsioides* and therefore also *Tittelbachia fuchsioides* (Hook.) Klotzsch.

The protologue of *B. miniata* Planch & Linden cites living material introduced into Brussels by M. Linden directly from Colombia (Planchon & Linden 1853: 105). No herbarium material was cited in the protologue, and we have been unable to locate any specimens collected by Linden in Colombia that could reasonably be considered as original material. Dorr (1999) was also unable to locate any herbarium material suitable for consideration as a potential lectotype. We therefore designate the excellent illustration in the protologue as the lectotype of *B. miniata* and its combinations. It would be reasonable to argue that the authors of *B. miniata* did not intend to describe a new species, which would mean *B. miniata* would be considered an invalid name. This is because the authors express doubt about whether *B. miniata* is a species or a variety of *B. fuchsioides*. The authors do however express the strong opinion of M. Putzey, the minister of justice of Brussels and 'amateur émérite' of *Begonia*, that *B. miniata* cannot be confused with *B. fuchsioides*. We consider this as proof that the authors did accept *B. miniata* as a new species, even if they did so under political pressure. *Begonia miniata* was soon relegated to a variety of *B. fuchsioides* by A.P. de Candolle (1864: 291) and then to a form by Voss (1894). Smith & Schubert (1946b: 146) then regonised *B. miniata* as a variety of *B. foliosa*.

The protologue of *Lepsia microphylla* Klotzsch cites the collection *J.W.K. Moritz 1263*, collected in Merida, Venezuela, but does not specify an herbarium (Klotzsch 1855: 182). There is material of this collection in several European herbaria and an unnumbered specimen at K (K000322986) collected by Moritz that may be a duplicate. In 1864, A.P. de Candolle transferred the species to the genus *Begonia* as *B. microphylla* (A.DC.) Klotzsch (de Candolle 1864: 375) and in doing so cited material of the type collection at Berlin, which constitutes an effective first stage lectotypification. Dorr (1999) later transferred this taxon to a variety of *B. foliosa* and erroneously cited the Berlin material as destroyed, but it survived the war in Irmscher's personal herbarium. Both specimens at Berlin are excellent, and we designate B100243005 as the lectotype of *L. microphylla* because it has a good selection of fruits and both staminate and pistillate flowers.

Klotzsch described *L. poeppigiana* Klotzsch using material collected in Peru by Eduard Friedrich Poeppig (Klotzsch 1855: 247). There are two Peruvian collections by Poeppig that match Klotzsch's description: *E.F. Poeppig s.n.* made in "Peruv. Subandin" and deposited in Berlin and Paris; and *E.F. Poeppig 1241* made in Cuchero and deposited in Oxford, Chicago, and G-BOIS in Geneva, with a further fragment in G-DC in Geneva. Klotzsch usually included full specimen details in his protologues, so if he had cited *E.F. Poeppig 1241*, we believe the collection number and detailed locality (i.e., Cuchero) would have been included in the locality. When A.P. de Candolle transferred *L. poeppigiana* into the genus *Begonia* in 1864, he cited material of *E.F. Poeppig s.n.* in Berlin herbarium and herb Petropolis. This constitutes an effective first stage lectotypification of *L. poeppigiana*. Dorr (1999) later cited the Berlin specimen as the holotype. This constituted an effective second stage lectotypification as Dorr cited F neg. 20823, which unambiguously shows the specimen B100243078.

**Identification notes**

*Begonia foliosa* is easily recognised as a frequently branching glabrous herb with small (< 5 cm long), pinnately nerved leaves. It differs from all other pinnately nerved Peruvian *Begonia* species in having < 4 secondary veins on both sides of the leaf lamina.

**Distribution and ecology**

Known from Venezuela, Colombia, and Ecuador. Within Peru, collected in Amazonas, Cajamarca, and Huánuco Regions (Fig. 76A). Found in lower and middle montane forest at an elevation of 815–2231 m a.s.l. *Begonia foliosa* can grow in relatively seasonal montane forest due to its thick, succulent stem. The species has been collected in flower throughout the year.

61. ***Begonia guaduensis*** Kunth in Humboldt *et al.* (1825)
Fig. 76B

*Nova Genera et Species Plantarum (quarto ed.), vol. 7*: 137 (Humboldt *et al.* 1825). – **Type**: COLOMBIA – **[Dept. Cundinamarca]** • prope Guaduas, inter Honda et Santa Fe de Bogotá; [5°05′ N, 74°36′ W]; Jul.; *F.W.H.A.v. Humboldt & A.J.A. Bonpland s.n.*; lectotype: P [P00307182, photo E [E00299521], G, US], first stage designated by Smith (1973: 217); second stage designated by Smith & Wasshausen (1979: 247); isolectotypes: P [P01900858], G-DC ex P.

de Candolle (1864: 319); Smith & Schubert (1946c: 183, 1952: 38, 1958: 64); Smith & Wasshausen (1986: 52, 1989: 29); Brako & Zarucchi (1993: 192); Burt-Utley (2015: 41).

*Begonia ottonis* Walp., *Repertorium Botanices Systematicae* 2: 212 (Walpers 1843a). – *Begonia walpersii* Heynh. (nom. illeg.; nom. superfl.), *Nomenclator botanicus hortensis* 2: 63 (Heynold 1846). – *Donaldia ottonis* (Walp.) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854). – **Type**: VENEZUELA • Caracas; *J.W.K. Moritz 124*; lectotype: B [F neg. 20888]; **designated here**.

Walpers (1858: 908).

*Begonia andreana* Sprague, *Transactions of the Botanical Society of Edinburgh* XXII: 433 (Sprague 1905). – *Begonia guaduensis* var. *andreana* (Sprague) L.B.Sm. & B.G.Schub., *Caldasia* 4 (18): 185 (Smith & Schubert 1946c). – **Type**: COLOMBIA • Villavicencio; [4°09′ N, 73°39′ W]; 24 Jan. 1899, *T.A. Sprague 133*; lectotype: K [K000536730], **designated here**; isolectotypes: BM [BM001191442], K [K000536731], US [US00115239].

Smith & Wasshausen (1989: 29).

*Begonia serratifolia* C.DC., *Smithsonian Miscellaneous Collections* 69: 7 (de Candolle 1919). – **Type**: PANAMA • Vicinity of San Felix, eastern Chiriquí; [8°18′ N, 81°53′ W]; 0–120 m a.s.l.; *H. Pittier 5126*; lectotype: US [US00115453], **designated here**; isolectotype: G.

Smith & Schubert (1946c: 184).

*Begonia laurina* hort. ex A.DC. (nom. inval.; nom. rej. pro syn. *Begonia ottonis* Walp.), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 292 (de Candolle 1864).

**Etymology**

The type specimen of this species was collected near the town of Guaduas in the present-day Province of Lower Magdalena of Colombia. The species is named for this locality.

**Selected specimens examined**

PERU – **Amazonas Region: Prov. Condorcanqui** • Región Noriental del Maráñon, puerto Mori, río Comaina; 4°23′ S, 78°21′ W. 800 m a.s.l.; 19 Aug. 1994; *R. Vásquez, N. Jaramillo, R. Apanu, A. Apanu & M. Ugkuch 18929*; MO [MO-286225], US [US00672868]. – **Prov. Bagua** • Aramango; [5°25′ S, 78°27′ W]; 350 m a.s.l.; 15 Oct. 1965; *A. Sagástegui A. 5871*; HUT, US [US00222152]. – **Cajamarca Region: Prov. San Ignacio** • Dist. Namballe, Bosque Pacashal, margen derecho y arriba del río Canchis; 4°58′ S, 79°10′ W; 650–800 m a.s.l.; 10 Jul. 1997; *E. Rodríguez R. & O. Pesantes 1672*; HUT, MO [2: MO-1641375, MO-1641376], US [US00672869], USM, NY • Dist. Huarango, entre San Martín y la Mushea; 5°16′ S, 78°43′ W; 900 m a.s.l.; 17 May 1996; *J. Campos, R. Vásquez, A. Vásquez & L. López 2779*; MO [MO-1641374], US [US00672867], USM • Huango-San Martín,

quebrada agua colorada; 5°22′ S, 78°30′ W; 900 m a.s.l.; *R. Vásquez & A. Vásquez 20863*; HUT, MO [2: MO-1641377, MO-1641378], USM. – **San Martín Region: Prov. Rioja** • Dist. Pardo Miguel, cerca a puente de Aguas Verdes, ruta a Venceremos; 5°40′ S, 77°38′ W; 1360–1500 m a.s.l.; 29 Jun. 1999; *I. Sánchez V., M. Zapata, G. Iberico & R. Diéguez 9934*; CPUN, F [V0086770F], US [US00673149] • Dist. Nuevo Cajamarca, entre Florida y Primavera, margen izqueirda del río Yaracyacu; 5°57′ S, 77°21′ W; 1020–1200 m a.s.l.; 25 Jun. 1999; *I. Sánchez-Vega, M. Zapata, G. Iberico & R. Diéguez 9894*; CPUN, F [V0086771F], US [US00673148] • Laguna Sauce; [6°42′ S, 76°13′ W]; 18 Oct. 1985; *L. Ramírez V. & A. Sotero M. 054-85*; HUT. – **Huánuco-Ucayali Region** • La Divisoria; [9°10′ S, 75°47′ W]; 5 Aug. 1965; *A. Aldave & M. Fernández 5616*; HUT.

### Description

Caulescent, herb, to 2 m high. *Stem* erect, branching; internodes to 7 cm long, to 10 mm thick, woody at the base to succulent, red, glabrous. *Stipules* deciduous, lanceolate, 6–20 × 3–5 mm, apex acute, translucent, pink to red, glabrous, margin entire, aciliate. *Leaves* > 5 per stem, alternate, basifixed; petiole 0.3–1 cm long, red, glabrous; blade subsymmetric, lanceolate, to 10 × 4.5 cm, membranaceous, apex acute to acuminate, base oblique, the larger side rounded, the narrower side cuneate, margin serrate, ciliate, upper surface green, glabrous, lower surface light green, glabrous, veins pinnate, with 5–7 secondary veins on the larger side, 5–7 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with up to 4 branches, bearing up to 32 staminate flowers and 32 pistillate flowers, protandrous; peduncle to 8 cm long, light grey, glabrous, bracts deciduous, ovate, 7–10 × 4–6 mm, translucent, white, glabrous, apex acute to obtuse, margin entire, aciliate. *Staminate flowers*: pedicels to 15 mm long, glabrous; tepals 4, spreading, outer 2 ovate, 6–10 × 6–10 mm, apex obtuse, white, glabrous, margin entire, aciliate, inner 2 elliptic, ca 4 × 2 mm, apex obtuse, white, glabrous, margin entire, aciliate; stamens 15–25, projecting, yellow, filaments 1–3 mm long, free, anthers ellipsoid, 1–1.5 × 0.5–0.8 mm long, dehiscing via lateral slits, connectives extended to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles 1, positioned directly below the ovary, ovate, ca 8 × 7 mm, apex rounded, translucent, colour unknown, glabrous, margin entire, aciliate; tepals 5, subequal, deciduous in fruit, spreading, the largest ovate, 8–12 × 4–6 mm, apex rounded, white, glabrous, margin entire, aciliate, the smallest elliptic, 6–10 × 1.5–3 mm, apex rounded, white, glabrous, margin entire, aciliate; ovary body ellipsoid, 8–10 × 4–6 mm, white, glabrous, unequally 3-winged, the largest triangular, 10–12 × 5–10 mm, the smallest marginal and 2 mm wide; 3-locular, placentae branches entire, bearing ovules between the surfaces; styles 3, yellow, free, 2–5 mm long, irregularly 3–5-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 25 mm long. *Fruit body* obovoid, to 25 × 10 mm, drying pale brown, wings same shape as in ovary, the largest expanding to 30 × 20 mm, the smallest expanding to 5 mm wide.

### Proposed conservation assessment

Outside of Peru, widespread and often locally common. Its distribution includes numerous protected areas and its EOO is > 6 000 000 km$^2$. We assess *B. guaduensis* as Least Concern (LC).

### Notes

Previous authors including Smith & Wasshausen (1989) and Doorenbos *et al.* (1998) have described the placentae of *B. guaduensis* as divided. All of our dissections of Peruvian collections have shown entire placentae.

### Typification notes

The protologue of *B. guaduensis* cited material collected in Guadas, modern day Colombia, by Humboldt and Bonpland but cited no herbarium (Humboldt *et al.* 1825: 178). There are two duplicates collected by Humboldt and Bonpland in Paris herbarium and these were cited by Smith (1973) as the type of

*B. guaduensis*, which constitutes an effective, first stage lectotypification. A second article by Smith & Wasshausen (1979) repeated this citation but also cited a photograph of the holotype in US herbarium. Only one of the two duplicates in Paris has a photograph at Paris herbarium, so this constitutes an effective, second stage lectotypification.

In the protologue of *B. ottonis* Walp., the author stated that the species was reported from Caracas (Walpers 1843a: 212). There are two specimens in Berlin herbarium collected by Johann Wilhelm Karl Mortiz: numbers *124* (F neg. 20888) and *127* (B100243091). The former specimen has a label citing the protologue of *B. ottonis*, dated Feb. 1843. This date clearly does not refer to the collection date as Moritz returned to Berlin from Venezuela in 1834. We interpret this label as implying that this sheet was used to prepare the description of *B. ottonis* and accordingly we designate *J.W.K. Moritz 124* (B) as the lectotype of *B. ottonis*. In 1846, Gustav Heynhold published the name *B. walpersii* Heyn. and included *B. ottonis* in synonymy. As *B. ottonis* is a legitimately published name, it should have been adopted by Heynhold so his *B. wapersii* is an illegitimate later homonym (Turland *et al.* 2018: Articles 51.1, 51.2).

In the protologue of *B. andreana* Sprague, the author cited *T.A. Sprague 133* but specifies no herbaria (Sprague 1905: 433). Sprague was based in Kew, so it is appropriate to designate a duplicate in Kew herbarium as the type. There are two sheets of this collection in Kew and no indication that they are part of the same duplicate. We therefore designate the most complete specimen (K000536730) as the lectotype. Similarly, the protologue of *B. serratifolia* C.DC. cites *H.F. Pittier 5126* but does not specify an herbarium. We know of two duplicates of this collection: one in G and one in US. The specimen in G includes only a fragment in an envelope so we designate the US specimen (US00115453) as the lectotype of *B. serratifolia*.

**Identification notes**

Both *B. guaduensis* and *B. foliosa* are frequently branching terrestrial herbs with pinnate venation within the leaf surface (vs raised from the lower leaf surface). *Begonia guaduensis* has much larger leaves with more secondary veins than *B. foliosa* (to 10 × 4.5 cm with 5–7 secondary veins vs to 3.5 × 1.2 cm with 1–4 secondary veins), around half as many stamens (15–25 vs 30–50), and multifid styles (vs bifid). *Begonia guaduensis* also has highly distinctive fruits, which are among the largest in Peruvian *Begonia*. The ovary in mature fruits expands to 25 × 10 mm and the largest wing reaches 30 × 20 mm.

**Distribution and ecology**

Known from Costa Rica, Panama, Venezuela, Guyana, Suriname, French Guiana, Colombia, Ecuador, and Brazil. Within Peru, known from Amazonas, Cajamarca, San Martín, and the border of Huánuco and Ucayali Regions (Fig. 76B). Found in Amazonian and lower montane forest at an elevation of 350–1500 m a.s.l. Within South America, *B. guaduensis* has a peri-Amazonian distribution, similar to those of *B. arrogans* and *B. ulmifolia*.

***Begonia*** sect. ***Microtuberosa*** Moonlight & Tebbitt

*European Journal of Taxonomy* 281: 4 (Moonlight *et al.* 2017a). – **Type**: holotype: *Begonia elachista* Moonlight & Tebbitt.

**Notes**

This is a monotypic section and the only endemic section of *Begonia* to Peru. It was erected by Moonlight & Tebbitt (2017a) based upon molecular evidence, which demonstrated that *B. elachista* was distantly related from all other tuberous Andean *Begonia* species and allied with two sections endemic to the Atlantic Rainforests of eastern South America. It is best recognised by its much smaller size (< 3 cm tall vs > 15 cm tall) and fewer stamens (two or four vs > 5) than all other tuberous Andean begonias.

62. ***Begonia elachista*** Moonlight & Tebbitt
Figs 78A, 79

*European Journal of Taxonomy* 281: 5 (Moonlight *et al.* 2017a). – **Type**: PERU – **Pasco Region: Prov. Oxapampa** • Parque Nacional Yanachaga-Chemillén, Sector Paujil, 150 m from entrance to las cavernas on trail from Pauji; 10°20′40″ S, 75°16′01″ W; 432 m a.s.l.; 25 Feb. 2016; *P.W. Moonlight & A. Daza 318*; holotype: MOL; isotypes: E [E00785221], MO [MO-3237389], USM.

### Etymology

Named for its status as the smallest known *Begonia* in the world, as the epithet derives from the Greek word ‘elachista’ meaning ‘least’.

### Specimen examined

PERU – **Pasco Region: Prov. Oxapampa** • Dist. Palcazú, Parque Nacional Yanachaga-Chemillén, sector Paujil, Quebrada Túnel; 10°20′ S, 75°15′ W; 429 m a.s.l.; 17 Mar. 2008; *R. Vásquez, A. Monteagudo, I. Huamantupa & A. Peña 34030*; E [E00785220], HOXA, HUT, MO [MO-2080521], USM.

### Description

Caulescent, tuberous herb, to 3 cm high. *Tuber* sub-globose, 0.1–0.2 × 0.1–0.2 cm, with 1 growing point. *Stem* erect, branching; internodes to 0.75 cm long, to 0.1 mm thick, pale green, glabrous. *Stipules* persistent, narrowly-lanceolate, 0.5–1.5 × 0.2–0.5 mm, apex acuminate, aristate, translucent, pale green, glabrous, margin entire, ciliate. *Leaves* 1–4, alternate, basifixed; petiole 0.2–2.5 cm long, pale green, glabrous; blade symmetrical to subsymmetric, ovate to suborbicular, to 3 × 2.5 cm, membranaceous, apex obtuse, base cordate, basal lobes not overlapping sinus to 2 mm deep, margin irregularly crenate, ciliate, upper surface pale green, glabrous, lower surface very pale green, glabrous, veins palmate, 5–7

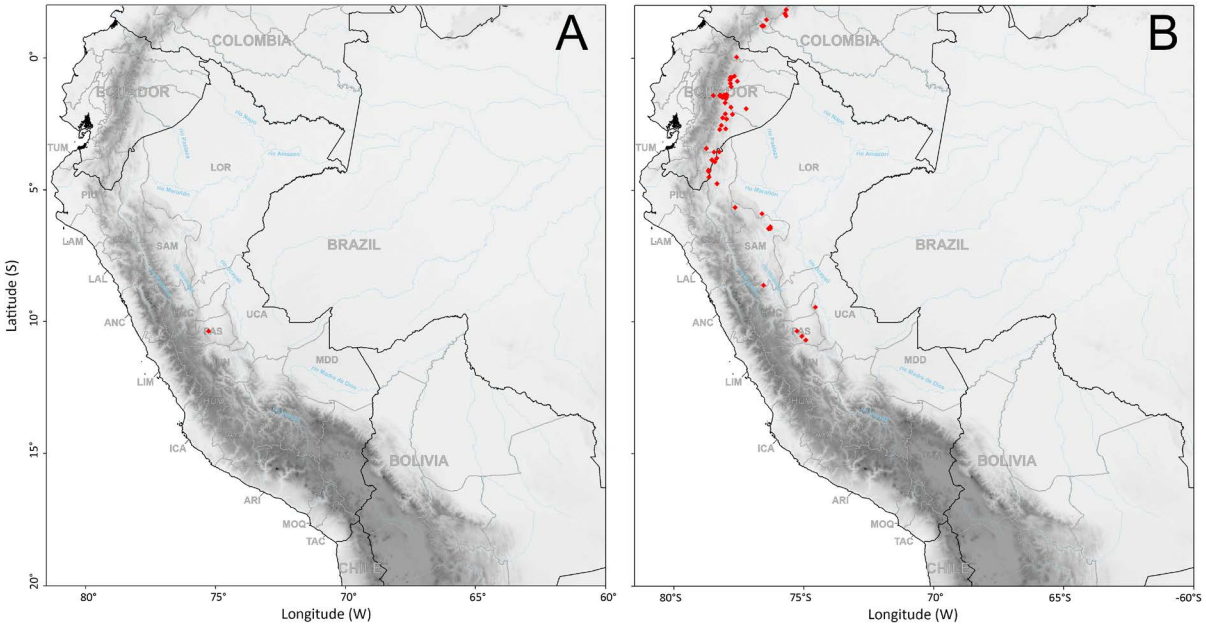


**Fig. 78.** Distribution of *Begonia* sect. *Microtuberosa* Moonlight & Tebbitt and *B.* sect. *Pilderia* (Klotzsch) A.DC. in Peru and surrounding countries. **A**. *B. elachista* Moonlight & Tebbitt (red). **B**. *B. buddleiifolia* A.DC. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

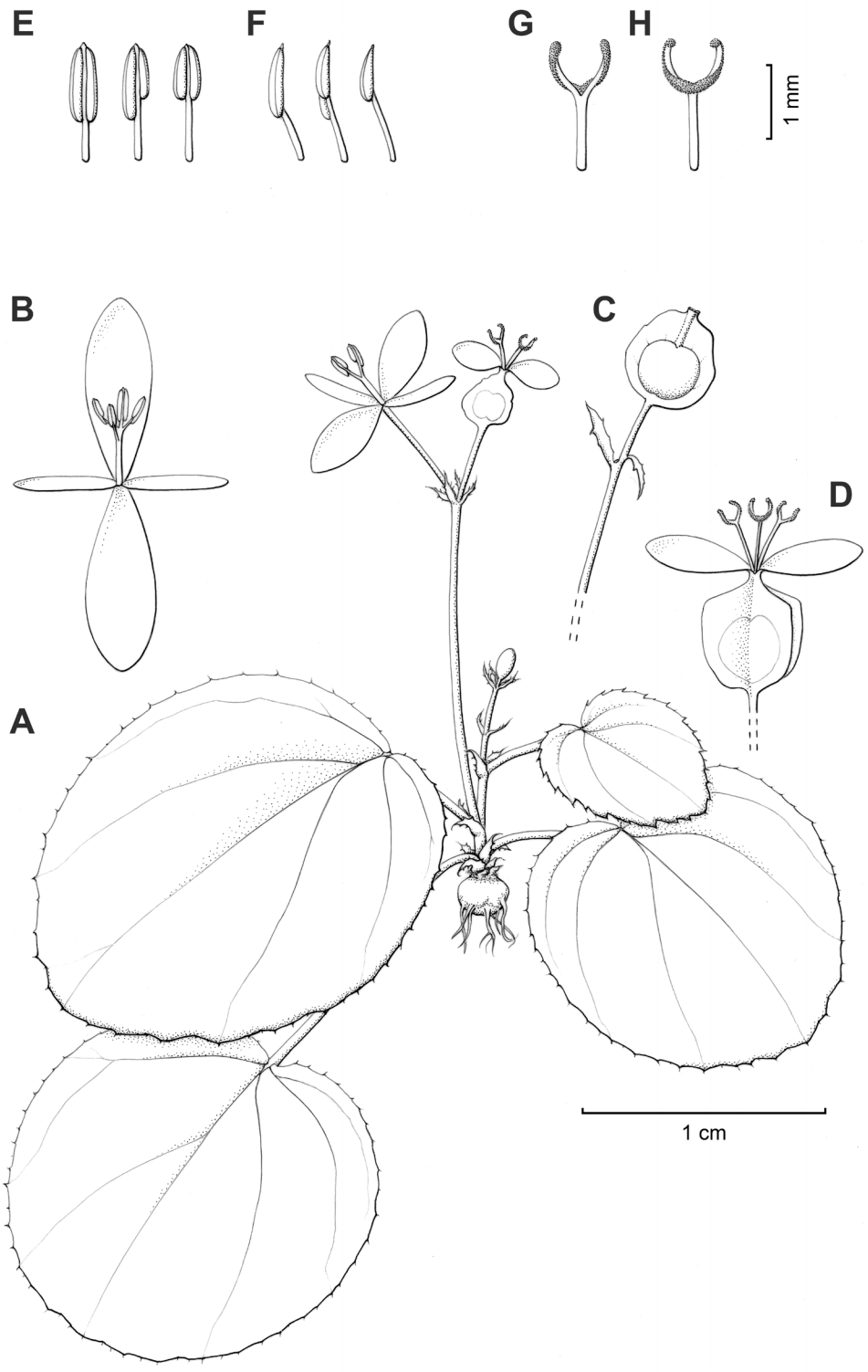


**Fig. 79.** *Begonia elachista* Moonlight & Tebbitt. **A**. Habit. **B**. Staminate flower, front view. **C**. Infructescence. **D**. Pistillate flower, side view. **E**. Stamens, front view. **F**. Stamens, side view. **G**. Pistil, back view. **H**. Pistil, front view. Illustration by Claire Banks from *P.W. Moonlight & A. Daza 318* (E). Reproduced from Moonlight *et al.* (2017a), with the permission of *European Journal of Botany*.

veined from the base. *Inflorescences* 1–2, bisexual, axillary, erect, a dichasial or monochasial cyme, with 1–2 branches, bearing up to 2 staminate flowers and 2 pistillate flowers, protandrous; peduncle to 4 cm long, pale green, glabrous, bracts persistent, elliptic, 1.5–2 × 0.1–0.3 mm, translucent, white, glabrous, apex acuminate, margin entire, ciliate. *Staminate flowers*: pedicels to 6 mm long, glabrous; tepals 2–4, spreading, outer 2 lanceolate to oblanceolate, 3–4 × 0.75–2.5 mm, apex obtuse to rounded, white, glabrous, margin entire, aciliate, inner 1–2 elliptic if present, 3–4 × 0.75–1.25 mm, apex obtuse to rounded, white, glabrous, margin entire, aciliate; stamens 2 or 4, projecting, yellow, filaments 0.25–0.75 mm long, united on a column, anthers ellipsoid, 0.75–1.5 × 0.25 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 5 mm long; bracteoles absent; tepals 2 or 3, equal, deciduous in fruit, spreading, the narrowly elliptic to oblanceolate, 3–4.5 × 0.75–2.5 mm, apex obtuse to rounded, white, glabrous, margin entire, aciliate; ovary body ovoid, 1.5–2.5 × 1–2.5 mm, pale green, glabrous, sub-equally 2- or 3-winged, wings rounded-oblong, 2–2.5 × 1–1.75 mm; 2- or 3-locular, placentae branches entire, bearing ovules on both surfaces; styles 2 or 3, yellow, free, 2–3 mm long, once-divided, stigmatic papillae in a spiral band. *Fruiting pedicel* to 5 mm long. *Fruit body* globose, to 2.5 × 2.5 mm, drying brown, wings same shape and size as in ovary.

### Proposed conservation assessment

Assessed by Moonlight *et al.* (2017a) as Critically Endangered (CR B2ab(iii)) because its single known locality was under threat from a tourist development in Parque Nacional Yanachaga-Chemillén. The proposed development has been cancelled, but the species remains vulnerable because of its extremely limited range and the fact that the locality is frequently visited by tourists. Accordingly, we recommend *B. elachista* remains categorised as Critically Endangered (CR B2ab(iii)).

### Identification notes

*Begonia elachista* is the smallest *Begonia* in Peru and possibly the world. It is the only South American *Begonia* that reaches < 5 cm in height and has leaves that only reach 3 × 2.5 cm in size.

### Distribution and ecology

Endemic to Peru and known from a single population in Oxapampa Province, Pasco Region (Fig. 78A). Found in Amazonian forest at an altitude of ca 430 m a.s.l., where it has been collected on a small, limestone outcrop and the surrounding rocks. *Begonia elachista* is tuberous and may be dormant during the dry season.

## ***Begonia*** sect. ***Pilderia*** (Klotzsch) A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 141 (de Candolle 1859). – *Pilderia* Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854). – **Type**: holotype: *Pilderia urticifolia* Klotzsch = *Begonia buddleiifolia* A.DC.

### Notes

Along with *B.* sect. *Australes* (Tebbitt 2020), this section is unique among those found in Peru in that it has been revised in the light of phylogenetic evidence (Moonlight & Jara-Muñoz 2017). As currently circumscribed, the section includes all South American species with an asymmetrical, terminal inflorescence and an indumentum of glandular hairs. Most species are endemic to northern South America but the range of *B. buddleiifolia* reaches as far south as southern Peru.

63. ***Begonia buddleiifolia*** A.DC.
Figs 4B, 7A, 78B, 80

*Annales des Sciences Naturelles Botanique, Série 4* 11: 141 (de Candolle 1859) [as '*buddleæfolia*']. – **Type**: PERU – **San Martín Region: Prov. Tarapoto** • Tarapoto, in humidis montius; [6°26′ S, 76°20′ W]; Dec. 1855; *R.E. Spruce 3998*; lectotype: G-DC [F neg. 7331], designated by Moonlight & Jara-Muñoz (2017: 5); isolectotypes: K [2: K000006046, K000006047], TCD [TCD0005567].

de Candolle (1864: 380); Smith & Schubert (1941a: 186, 1946b: 100, 1952: 37); Smith (1973: 216); Smith & Wasshausen (1979: 238, 1986: 11, 1989: 33); Brako & Zarucchi (1993: 191); Vásquez *et al.* (2005: 112–125).

*Pilderia urticifolia* Klotzsch, *Gattungen und Arten* 1854: 186 (Klotzsch 1855) [as '*urticaefolia*']. – *Begonia urticifolia* (Klotzsch) Warb. in Engler & Prantl. (nom. illeg.; later homonym non Sm.), *Naturlichen Pflanzenfamilien* 3 (6A): 144 (Warburg 1894). – *Begonia pilderia* A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 380 (de Candolle 1864). – **Type**: COUNTRY UNKNOWN • *hort. Berol. s.n.*; lectotype: B [B100365220], designated by Moonlight & Jara-Muñoz (2017: 5).

Walpers (1858: 901); Smith & Schubert (1946b: 100).

*Begonia lantanifolia* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 141 (de Candolle 1859) [as '*lantanæfolia*']. – **Type**: COLOMBIA – **[Dept. Norte de Santander]: Prov. De Ocaña** • San Pedro; [8°09′ S, 73°24′ W]; 2135–2440; May 1856–1852; *L. Schlim 578*; lectotype: G-DC [F neg. 7332], designated by Moonlight & Jara-Muñoz (2017: 6); isolectotypes: BM [BM001191437], BR [BR0000006956592], K [K000536735], P [P05586842].

Smith & Schubert (1946b: 100); Moonlight & Jara-Muñoz (2017: 6).

*Begonia urticifolia* hort. ex Klotzsch (nom. inval.; nom. rej. pro syn. *Pilderia urticifolia* Klotzsch (nom. inval.; nom. nud.)), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854) [as '*urticaefolia*'].

*Pilderia urticifolia* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854) [as '*urticaefolia*'].

**Etymology**

Named for the superficial resemblance of the species' leaves to those of species of buddleja (*Buddleja* L., Scrophulariacae).

**Selected specimens examined**

PERU – **Loreto Region: Prov. Alto Amazonas** • Dist. Balsapuerto, Campamento Mina de Sal; 5°53′22″ S, 76°36′15.7″ W; 267 m a.s.l.; 15 Sep. 2013; *M. Ríos, T. Mori, D. Neill, L. Torres & C. Vriesendorp 2963*; F [V0323706F]. – **Prov. Ucayali** • Dist. Pampa Hermosa, Parque Nacional Cordillera Azul, PV 106 Boca Pauya, río Aguablanca y río Cushabatay; 7°03′46.2″ S, 75°51′46.2″ W; 399 m a.s.l.; 28 May 2018; *L. Valenzuela, J. Flores, G. Shareva, R. Vilacorta & R. Macedo 35295*; USM. – **Amazonas Region: Prov. Condorcanqui** • Cordillera del Cóndor; Jul. 1994; *H. Beltrán & R.B. Foster 801*; US [US00619625] • Dist. El Cenepa, río Chinganatza (quebrada de los bambúes), Campamento 2; 3°47′18.5″ S, 78°20′35.9″ W; 685 m a.s.l.; 12 Nov. 2003; *S. Baldeón M., M. Epiquien & F. Chinta T. 5729*; USM • Cordillera del Cóndor, Puesto de Vigilancia Alfonso Ugarte (PV 3), Cabeceras del río Comainas, tributario al oeste del río Cenepa; 3°55.3′ S, 78°25.2′ W; 1050–1150 m a.s.l.; 5 Aug. 1994; *H. Beltrán & R.B. Foster 1612*; USM. – **Prov. Bagua** • Dist. Imaza, Comunidad Aguaruna de Kusú-Listra, Cerro Apag, margen derecha Quebrada Kusú; [4°45′ S, 78°20′ W]; 600 m a.s.l.; 19 Jun. 1996; *C. Diaz, A. Pena, R. Tiwi & D. Shuwin 8277*; MO [MO-286130], MOL, US [US00672836], USM. – **Huánuco: Prov. Marañón** • Dist. Cholón, Caserío Puerto Alegre, bajando de casa de señor Arturo hacia Caserío San Antonio de Padua; 8°36′12.29″ S, 76°32′31.45″ W; 1000 m a.s.l.; 15 Jul. 2021; *P. González & P.*

*Arista 8745*; USM. – **San Martín Region: Prov. Rioja** • Dist. Pardo Miguel, Bosque de Protección Alto Mayo, on the way from El Afluente Pte to Nuevo Edén; 5°37′49.19–38″ S, 77°41′24.51–29.12″ W; 1350 m a.s.l.; 18 Jul. 2014; *Y.F. Deng et al. 1468*; USM • Dist. Pardo Miguel, Centro Poblado Aguas Verdes Camp-I; 5°39′ S, 77°38′ W; 1130 m a.s.l.; 24 Jun. 1998; *I. Sánchez Vega, M. Dillon & M. Zapata 9470*; CPUN, F [V0086764F], US [US00673142]. – **Prov. San Martín** • 25 km N of Tarapoto; [6°23′ S, 76°17′ W]; 550 m a.s.l.; 9 May 1979; *D.C. Wasshausen & F. Encarnación 1033*; K, MO [MO-1643588], NY, US [US00222037], USM • Dist. Tarapoto, Carretera de Tarapoto a Yurimaguas, km 10; [6°27′ S, 76°17′ W]; 750–1000 m a.s.l.; 5 Dec. 1979; *M. Rimachi Y. 4805*; US [US00424989] • Trail to waterfall in Cordillera Escallera, La Bocotoma de Shilcayo; 6°27′29″ S, 72°20′56″ W; 448 m a.s.l.; 3 Feb. 2016; *P.W. Moonlight & A. Daza 165*; E [E00885874], G, MO, MOL. – **Ucayali Region: Prov. Coronel Portillo** • Dist. Iparía, cuenca del río Iparía, afluente del río Ucayali, Reserve Comunal El Sira; 9°25′57″ S, 74°32′47″ W; 350–400 m a.s.l.; 28 Sep. 2007; *J.G. Graham 4812*; MOL, US [US01008605]. – **Pasco Region: Prov. Oxapampa** • Parque Nacional Yanachaga-Chemillén, Sector Paujil, "Mal Paso" on trail from Paujil Research Centre to Pampa Pescado; 10°20′22″ S, 75°15′21″ W; 377 m a.s.l.; 25 Feb. 2016; *P.W. Moonlight & A. Daza 316*; E [E00885873], MO [MO-3254783], MOL • Along road Chatarra-Pto. Bermúdez; 10°32′ S, 75°04′ W; 700 m a.s.l.; 12 Jul. 2003; *H. van der Werff, R. Vásquez, B. Grey, R. Ortiz & N. Davila 18405*; F, HOXA, MO [MO-1102982], US [US00843954] • Pichis trail between San Nicolas and Azupizú; [10°41′ S, 74°55′ W]; 650–900 m a.s.l.; 6 Jul. 1919; *E.P. Killip & A.C. Smith 26101*; NY, US [US00222039]. – **Cultivated** • Grown in the Royal Botanic Garden Edinburgh from *P.W. Moonlight & A. Daza 165* RBGE Living Accession 20160126; 22 Mar. 2021; *P.W. Moonlight 1951*; E.

**Description**

Caulescent herb, to 50 cm high. *Stem* prostrate to erect, branching; internodes to 8 cm long, to 0.5 mm thick, succulence, green to light brown, sparsely to densely lanate. *Stipules* persistent, ovate, 6–12 × 1.5–4 mm, apex acute, opaque, light green to light brown, glabrous but with a line of villous hairs down the midrib, margin entire, ciliate. *Leaves* > 5, alternate, basifixed; petiole 0.5–1 cm long, light green to red or light brown, sparsely to densely lanate; blade asymmetrical, lanceolate, to 12 × 5 cm, membranaceous, apex acuminate, cuneate to shallowly-cordate, margin serrulate or denticulate to double-dentate, ciliate, upper surface bullate, pale green to red, densely glandular pilose between the tertiary veins, the veins sparsely to densely villous or lanate, lower surface pale green, glabrous, veins pinnate, with 8–12 secondary veins on the larger side, ca 8 secondary veins on the smaller side. *Inflorescences* 1–3, bisexual, terminal, erect, thyrsoid, with ca 15 lateral branches, bearing up to 5 staminate flowers and 10 pistillate flowers, protandrous; peduncle to 4 cm long, white, glabrous, bracts persistent, ovate, 2–5 × 0.5–2 mm, translucent, white, glabrous, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 8 mm long, glabrous; tepals 2 or 4, spreading, outer 2 ovate, 4–6 × 3–4 mm, apex rounded, white, glabrous, margin entire, aciliate, inner 2 lanceolate to ovate, 1–2 × 0.5–2 mm, apex acute, white, glabrous, margin entire, aciliate; stamens ca 40, projecting, yellow, filaments 0.5–1 mm long, fused into a 1–2 mm long column, anthers oblong, ca 0.4 × ca 0.6 mm, dehiscing via lateral slits, connectives extending to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 12 mm long; bracteoles 2, directly beneath the ovary, ovate, 5–6 × 3–4 mm, apex rounded, translucent, white, glabrous, margin serrulate, ciliate; tepals 5, subequal, persistent in fruit, projecting, the largest oblanceolate, 6 × 3 mm, apex rounded, white, glabrous, margin entire, aciliate, the smallest elliptic, 3 × 1 mm, apex rounded, white, glabrous, margins entire, aciliate; ovary body globose, 4–5 × 3.5–4 mm, white to pale green, pilose, unequally 3-winged, wings triangular, largest 5–9 × 5–10 mm, smallest 4–5 × 1–3 mm; 3-locular, placentae branches entire, bearing ovules on both surfaces; styles 3, yellow, free, 1.5–2 mm long, 2-lobed, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 12 mm long. *Fruit body* ovate, to 8 × 5 mm, drying brown, wings same shape as in ovary, expanding to 13 mm tall.

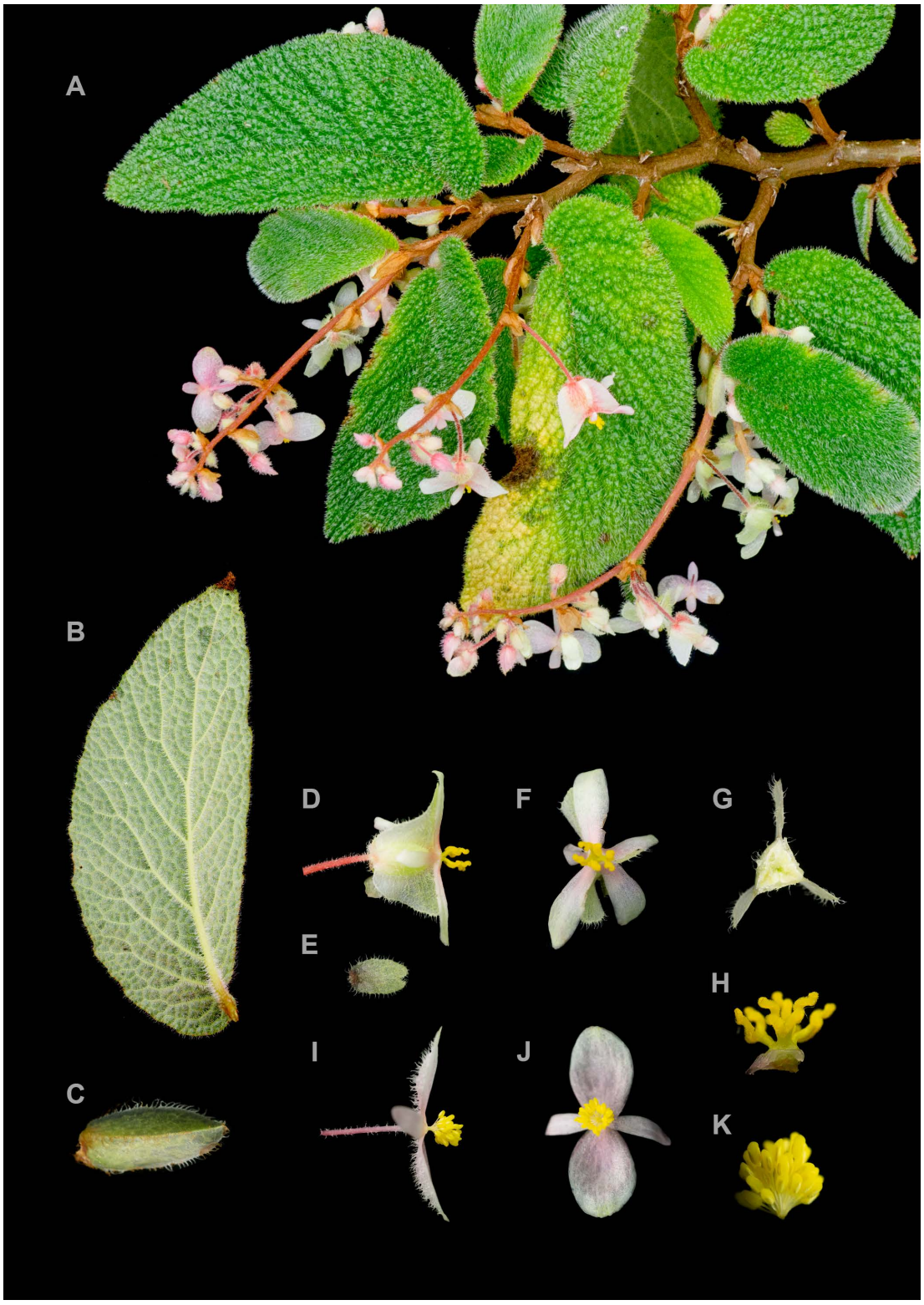


**Fig. 80.** *Begonia buddleiifolia* A.DC. **A**. Habit. **B**. Leaf, abaxial surface. **C**. Stipule. **D**. Pistillate flower, side view. **E**. Bracteole. **F**. Pistillate flower, front view. **G**. Cross section of ovary. **H**. Pistils, side view. **I**. Staminate flower, side view. **J**. Staminate flower, front view. **K**. Androecium, side view. All photographs taken by P.W. Purvis in the living collections of the Royal Botanic Garden Edinburgh (Accession 20160126, grown from seeds collected as part of *P.W. Moonlight & A. Daza 165*).

### Proposed conservation assessment

Assessed by Moonlight & Jara-Muñoz (2017) as Least Concern (LC).

### Identification notes

*Begonia buddleiifolia* is a very distinctive species and is unique in Peru in both its bullate leaf lamina and in its asymmetrical, terminal inflorescence.

### Distribution and ecology

Known from Venezuela, Colombia, Ecuador, and Peru. Within Peru, known from Loreto, Amazonas, San Martín, Huánuco, Ucayali, and Pasco Regions (Fig. 78B) and found within Amazonian and lower montane forest at an elevation of 250–1350 m a.s.l. *Begonia buddleiifolia* is scarce in Peru where it is typically collected on rock or soil banks adjacent to streams and rivers. We suspect that it may have a broader distribution within Peru than detailed here.

## ***Begonia*** sect. ***Pritzelia*** (Klotzsch) A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 137 (de Candolle 1859). – *Pritzelia* Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 126 (Klotzsch 1854). – **Type**: lectotype: *Pritzelia fischeri* (Otto & A.Dietr.) Klotzsch ≡ *Begonia dietrichiana* Irmsch., designated by Barkley & Baranov (1972: 6).

### Synonymy notes

For a full list of sectional synonyms, see Moonlight *et al.* (2018).

### Notes

Most species of *B.* sect. *Pritzelia* are endemic to the Atlantic forests of Brazil and the section is amongst the most morphologically diverse in the Americas. Species in this section are united by their entire placentae and the presence of cystoliths composed of oxalic acid within their leaf laminae (Doorenbos *et al.* 1998). The section is represented within Peru by a single species.

Prior to the first molecular sectional classification of *Begonia*, no species in the section were known from the Andes (Doorenbos *et al.* 1998); however, this changed when *B.* sect. *Scheidweilaria* (Klotzsch) A.DC. was brought into its synonymy (Moonlight *et al.* 2018). This section differed in its deeply incised or rarely palmately compound leaves, its shorter anthers, and its flattened seeds, but was found to be nested with *B.* sect. *Pritzelia*.

### 64. ***Begonia parviflora*** Poepp. & Engl.
Figs 81A, 82

*Nova Genera ac Species Plantarum* 1: 7 (Poeppig & Endlicher 1835). – *Scheidweileria parviflora* (Poepp. & Endl.) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 179 (Klotzsch 1854). – **Type**: PERU – **[Huánuco Region: Prov. Marañón]** • Andinum Peruviae orientalis ad Pampayaco; [9°33′ S, 75°54′ W]; Jun.–Sep.; *E.F. Poeppig s.n.*; syntype: W [n.v.].

Klotzsch (1855: 179); de Candolle (1864: 370); Walpers (1858: 897); Smith & Schubert (1941a: 195, 1944: 83, 1946b: 93, 1952: 39); Smith & Wasshausen (1979: 238, 1986: 10); Brako & Zarucchi (1993: 194); Wasshausen *et al.* (2014: 385); Burt-Utley (2015: 71).

*Begonia myriantha* Britton, *Bulletin of the Torrey Botanical Club* 18 (2): 35 (Britton 1891). – **Type**: BOLIVIA • Unduavi; [16°19′ S, 67°54′ W]; 2438 m a.s.l.; Oct. 1885; *H.H. Rusby 691*; lectotype:

NY [NY00118634], **designated here**; isolectotypes: BM [BM001191446], F [V0052634F], GH [2: GH00068258, GH00068259], K [K000536739], MICH [MICH1115795], NY [NY00118633], PH [PH00007795], US [2: US00222465, US00115399], WIS [WISv0257074WIS].

Smith & Schubert (1941a: 196).

*Begonia micrantha* Steud. (nom. inval.; nom. nud.), *Nomenclator Botanicus* 1: 194 (von Steudel 1840).

**Etymology**

Named for its small flowers, which are extremely numerous and occur in inflorescences up to 1 m in diameter and likely larger.

**Selected specimens examined**

PERU • *A. Matthews 1211*; K • Peruvia subandina, *E.F. Poeppig 1064*; P [2: P06841681, P06841682]. – **Loreto Region: [Prov. Alto Amazonas]** • Balsapuerto; ca 220 m a.s.l.; [5°50′ S, 76°34′ W]; May 1933; *G. Klug 3073*; BM, K, MO [MO-1641660], NY • Putayacu, between Balsapuerto and Moyabamba; 600–1200 m a.s.l.; *G. Klug 3225*; K, MO [MO-1641314], NY. – **Amazonas Region: Prov. Bagua** • Road from Bagua to Santa María de Nieva; 5°17′44″ S, 78°23′26″ W; 712 m a.s.l.; 30 Jan. 2016; *P.W. Moonlight & A. Daza 137*; E [2: E00885587, E00885588], MOL • Dist. Aramango, Nueva Esperanza, camino hacia la Catarata; 5°28′31.0″ S, 78°21′52.9″ W; 1304 m a.s.l.; *A. Orejuela, M. Cueva & J. Castillo 2734*; E [E01053108], USM • Serrania de Bagua, cordillera between río Utcubamba and río Chiriaco above La Peca; [5°35′ S, 78°23′ W]; 1700 m a.s.l.; 20 Jun. 1978; *P.J. Barbour 2389*; MO [2: MO-1641649, MO-1641650], NY [2], USM. – **Prov. Bongará** • 4 km N of Pomacochas on road to Rioja, trail down W of road; 5°40′ S, 77°22′ W; 2150–2200 m a.s.l.; 2 Jun. 1986; *S. Knapp, P. Alcorn, J. Mallet & H. Esley 7485*; MO [2: MO-1642821, MO-1835889] • Dist. Yambrasbamba, cerca a Laguna Negra; [5°43′ S, 77°56′ W], 1860–2000 m a.s.l.; 2–26 Mar. 1967; *S.S. Tillett 673-344*; USM • Dist. Yambrasbamba, Yambrasbamba-Pomacocha between Yambrasbamba and Yanayacu; [5°46′ S, 77°55′ W]; 1900–2200 m a.s.l.; 24 Jun. 1962; *J.J. Wurdack 1022*; NY, USM. – **Prov. Chachapoyas** • Soloco, Oliañahui; [6°16′ S, 77°42′ W]; 2300–2500 m a.s.l.; 24 Nov. 1990; *C. Díaz, J. Amaro & J.W. 4268*; MO [MO-1835912], USM. – **Prov. Rodríguez de Mendoza** • Dist. Mariscal Benavides, Izcuchaca; 6°19′40″ S, 77°31′05″ W; 1880 m a.s.l.; 29 Aug. 1998; *R. Vásquez & J. Campos 25291*; MO [2: MO-1641646, MO-1641647]; USM • Dist. Leimebamba, road from Monte Alegre to San Cayetano; 6°35′41″ S, 77°31′10″ W; 1840 m a.s.l.; 19 Aug. 2012; *R.W. Bussmann et al. 17151*; E [E00849168]. – **Piura Region: Prov. Huancabamba** • Dist. El Carmen de la Frontera, Rosarios Bajo, trocha entra campamento minero río Blanco y el Tambo; [5°00′ S, 79°22′ W]; 2190–2550 m a.s.l.; 24 Apr. 2006; *A. Cano, N. Valencia & I. Salinas 16312*; USM • Dist. El Carmen de la Frontera, río Samaniego, margen derecha, zona de amortiguamiento del Santuario Nacional Tabaconas-Namballe; [5°06′ S, 79°21′ W]; 2150–2200 m a.s.l.; 25 Apr. 2003; *S. Baldeón M.M. & J. Campos 5315*; USM • arriba de Palambla; [5°23′ S, 79°36′ W]; 1500–1600 m a.s.l.; *R. Ferreyra, E. Cerrate de Ferreyra & O. Tovar 10851*; USM [2]. – **Cajamarca Region: Prov. San Ignacio** • Dist. San José de Lourdes, Passe del Cerro Picorana; 4°59′25″ S, 78°54′05″ W; 2010 m a.s.l.; 18 Jan. 1999; *C. Díaz et al. 10296*; MO [MO-1835911] • Dist. San José de Lourdes; 5°10′ S, 78°54′ W; 1750 m a.s.l.; *I. Salinas 3*; USM • Dist. Huarango, San Martín-Quebrada Colorada; 5°17′ S, 78°42′ W; 860 m a.s.l.; 15 May 1996; *J. Campos, R. Vásquez, A. Vásquez & P. López 2747*; HUT, MO [2: MO-1641642, MO-1641642], NY, USM. – **Prov. Cutervo** • Dist. San Andrés de Cutervo, Parque Nacional de Cutervo, NW corner of Cordillera Tarros, Chorro Blanco Sector, ca 10 km WNW of San Andrés de Cutervo; 6°12′ S, 78°46′ W; ca 2550 m a.s.l.; 3 Nov. 1990; *M.O. Dillon, I. Sánchez & J. Guevara B. 6110*; CPUN • Road from Cutervo to San Andrés de Cutervo; 6°15′43″ S, 78°41′54″ W; 2504 m a.s.l.; 26 Jul. 2014; *P.W. Moonlight & A. Daza 72*; E [E00835916], MOL • La Pucarilla entre Socota y San Andrés; [6°16′ S, 78°42′ W]; 2500 m a.s.l.; 2 Nov. 1991; *I. Sánchez V., A. Sagastegui & J. Guevara 5964*; CPUN, MO [MO-1641279], NY. – **San Martín Region: Prov. Rioja** • Dist. Pardo Miguel, El Afluente y la Marginal; 5°40′ S, 77°42′ W; 1300 m a.s.l.; *I. Sánchez*

*V. & M. Dillon 9020*; CPUN, F • Km 399 of Carretera Marginal, trail to quebrada Venceremos and río Serranoyacu, 67 km E of Pomacochas, 8 km W of bridge of río Serranoyacu; 5°45′ S, 77°29′ W; 1400–1500 m a.s.l.; 13 Jun. 1986; *S. Knapp & P. Alcorn 7745*; MO [MO-1641664], USM • Pedro Ruiz Gallo-Moyobamba road, km 390, Venecermos; 5°50′ S, 77°45′ W; 1770–2150 m a.s.l.; 5–7 Aug. 1983; *D.N. Smith & S. Vásquez 4614*; MO [MO-1641325]. – **Prov. Moyabamba** • 1838; *A. Matthews s.n.*; K • entre Nuevo Cajamarca y Venceremos, km 420 carretera Moyobamba; [5°45′ S, 77°29′ W]; 22 Jun. 1981; *I. Sánchez V. 2625*; CPUN [2], F [V0086774F]. – **Prov. Lamas** • Dist. Alonso de Alvarado, San Juán de Pacayzapa, al este del puente (carretera a Moyobamba); [6°16′ S, 76°46′ W]; 900 m a.s.l.; 14 Apr. 1973; *J. Schunke V. 5933*; NY [2], U [2]. – **Prov. San Martín** • Road from Tarapoto to Yurimaguas; 6°22′53″ S, 76°16′49″ W; 394 m a.s.l.; 3 Feb. 2016; *P.W. Moonlight & A. Daza 171*; E [E00885612], MO [3: MO-3254779, MO-3254785, MO-3254788], MOL • Cataratas de Ahuashiyacu, km 15 Tarapoto-Yurimaguas; 6°29′ S, 76°21′ W; 700 m a.s.l.; 19 Jun. 1986; *S. Knapp & P. Alcorn 7788*; MO [MO-1641665], USM • Route from Tarapoto to Tocache, 7°44′31″ S, 76°39′39″ W; 917 m a.s.l.; 6 Feb. 2016; *P.W. Moonlight & A. Daza 187*; MOL. – **Prov. Mariscal Cáceres** • río del Peligro, E of río de las palmas; ca 7°S, 77°W; 2300 m a.s.l.; 14 Aug. 1986; *K. Young 3946*; HUT • ibid.; ca 7°S, 77°W; 2300 m a.s.l.; *K. Young 4084*; USM. – **Prov. Huallaga** • Dist. Saposoa, alrededores de Monumentos Históricos de Buenos Aires (Zarumilla); 6°36′34″ S, 77°21′30″ W; 1440 m a.s.l.; 11 Aug. 2000; *V. Quipuscoa S., S. Leiva G., Y. Díaz V. & M. Strarup 2039*; HUT • Abajo de La Morada; 6°37′ S, 77°32′ W; 2000–2200 m a.s.l.; 12 Aug. 1997; *V. Quipuscoa & J. Bardales 1015*; HUT, MO [2: MO-1944292, MO-1944293], NY • Small path to Chacre off to the right of route from Saposoa to El Dorado; 6°55′16″ S, 76°49′39″ W; 935 m a.s.l.; 5 Feb. 2016; *P.W. Moonlight & A. Daza 178*; E [E00885599], G, MOL. – **Ucayali Region: Prov. Coronel Portillo** • Cordillera Azul, km 43 on Tingo María-Pucallpa road; [9°09′ S, 75°45′ W], ca 1500 m a.s.l.; 5 Jun. 1981; *K. Young & G. Sullivan 748*; MO [MO-1641638] • Dist. Iparía, cuenca del río Iparía, afluente del río Ucayali, Reserva Comunal el Sira; 9°25′57″ S, 74°32′47″ W; 350–400 m a.s.l.; 22 Sep. 2007; *J.G. Graham 4754*; MOL, US [US01008603]. – **Prov. Padre Abad** • Dist. Padre Abad, Cuenca del río Aguaytía, quebrada Chesman, cerca al Boquerón de Padre Abad; 9°03′ S, 74°40′ W; 350–400 m a.s.l.; 4 Mar. 2004; *J. Schunke V. & J.G. Graham 15842*; F [V0088035F], G • Dist. Padre Abad, Boquerón de Padre Abad; 9°04′24″ S, 75°41′02″ W; 410 m a.s.l.; 8 Feb. 2016; *P.W. Moonlight & A. Daza 201*; E [E00885581], MOL • Dist. Padre Abad, cumbre de la Divisoria, entre Ucayali y Huánuco, cabecera del río Yurac, afluente del río Aguaytía; 9°11′03″ S, 75°47′47″ W; 1500–1600 m a.s.l.; 26 Jun. 2007; *J.G. Graham & J. Schunke V. 4053*; MOL, US [US01008608]. – **Huánuco Region: Prov. Marañón** • Route W from Uchiza; 8°36′42″ S, 76°36′25″ W; 1182 m a.s.l.; *P.W. Moonlight & A. Daza 205*; E [2: E00885585, E00885586], MOL. – **Prov. Leoncio Prado** • Road between Tingo María and Pucallpa, km 32; 9°10′ S, 75°50′ W; 1350 m a.s.l.; 3 Jun. 1981; *G. Sullivan & K. Young 1123*; MO [MO-1835902] • Road from Tingo María to Divisoria, 9°12′09″ S, 75°49′30″ W; 1718 m a.s.l.; 7 Feb. 2016; *P.W. Moonlight & A. Daza 190*; E [E00885616], MOL • Along road between Tingo María and Pucallpa, 16 km NE of turn off to Pucallpa north of Tingo María, 1.8 km SW of San Isidro; 9°20′57″ S, 76°00′50″ W; 800 m a.s.l.; 3 Jun. 1998; *T.B. croat & M. Sizemore 81657*; MO [2: MO-1641638, MO-1641637], USM. – **Prov. Huánuco** • Gasa, 12 km W of Punte Durand, N of Huánuco, río Chinchao Valley; [9°38′ S, 76°03′ W]; 1300 m a.s.l.; 5 Nov. 1938; *H.E. Stork & O.B. Horton 9859*; K • Hacienda Paty entre Huánuco y Tingo María; [9°39′ S, 76°03′ W]; 2300–2400 m a.s.l.; 23 Jun. 1953; *R. Ferreyra 9406*; USM • A dos horas de Paty (cerca al campamento); 9°41.8′ S, 76°5.28′ W; 2400 m a.s.l.; *I. Salinas & M. Chocce 410*; USM. – **Pasco Region: Prov. Oxapampa** • Dist. Huancabamba, Parque Nacional Yanachaga-Chemillén, sector Tunqui; 10°16′13″ S, 75°31′00″ W; 1840 m a.s.l.; 13 Feb. 2008; *R. Vásquez, A. Monteagudo, A. Peña, J. Mateo, V. Fores & R. Rivera 33417*; HOXA, USM • Dist. Huancabamba, Parque Nacional Yanachaga-Chemillén, sector San Daniel; 10°26′35″ S, 75°26′16″ W; 2200–2500 m a.s.l.; *R. Vásquez, A. Monteagudo, A. Peña, J. Mateo & V. Flores 31140*; HOXA, MO [MO-2039745] • Dist. Villa Rica, Cerro el asensor, Bosque de Protección San Matias-San Carlos; 10°45.28′ S, 74°55.92′ W; 1355 m a.s.l.; 28 Jun. 2003; *J. Perea & C. Mateo 77*; HOXA, MO [MO-1102975], US [2: US00843976, US00843977]. – **Junín Region: Prov. Chanchamayo**

• Pichis trail, Yapas, [Yapaz]; [10°51′ S, 75°16′ W]; 1350–1600 m a.s.l.; 28–29 Jun. 1929; *E.P. Killip & A.C. Smith 25481*; NY • East of Quimirí Bridge, near La Merced; [11°02′ S, 75°18′ W]; 800–1300 m a.s.l.; 1–3 Jun. 1929; *E.P. Killip & A.C. Smith 23851*; NY • Schunke Hacienda, above San Ramón; [11°10′ S, 75°26′ W]; 1400–1700 m a.s.l.; 8–12 Jun. 1929; *E.P. Killip & A.C. Smith 24600*; NY. – **Prov. Jauja** • road from Monobamba to Jauja; 11°23′31″ S, 75°19′39″ W; 1705 m a.s.l.; 17 Feb. 2016; *P.W. Moonlight & A. Daza 263*; E [E00885582], MOL • Road from Monabamba to Uchumayo; 11°28′12″ S, 75°15′35″ W; 1950 m a.s.l.; 17 Feb. 2016; *P.W. Moonlight & A. Daza 268*; E [2: E00885583, E00885584], G, MOL. – **Prov. Satipo** • Road Satipo to Comas, above Mariposa; 11°26′27.6″ S, 74°46′54.4″ W; 1430 m a.s.l.; 1 Oct. 2007; *R.T. Pennington & A. Daza 1992*; E [E00567553], MOL • Road from Comas to Satipo, km 152, 11°30′38″ S, 74°40′00″ W; 2379 m a.s.l.; 12 Feb. 2016; *P.W. Moonlight & A. Daza 234*; E [E00885567], MOL • La Molina University Field Station, ca 10 km N of Satipo on 5S, ca 2 km E of field station; 11°09′40″ S, 74°38′32″ W; 1026 m a.s.l.; 20 Jun. 2014; *P.W. Moonlight & A. Daza 22*; E [E00724459], MOL. – **Ayacucho Region: Prov. La Mar** • Ccarrapa, between Huanta and río Apurimac; [12°43′ S, 73°55′ W]; ca 1500 m a.s.l.; 5–17 May 1929; *E.P. Killip & A.C. Smith 22390*; NY [2]. – **Madre de Dios Region: Prov. Manu** • río Palotoa, tributary of Alto Madre de Dios, NW of Shintuya; [12°38′ S, 71°21′ W]; 500 m a.s.l.; 26–28 Aug. 1978; *R.B. Foster 6768*; F • 8 km N of Salvación on road to Shintuya; [12°46′ S, 71°22′ W]; ca 500 m a.s.l.; 29 Jun. 1978; *A.H. Gentry, M. Dillon, P. Berry & J. Aronson 23612*; MO [MO-1641322] • río Salvación; [12°50′ S, 71°22′ W]; 589 m a.s.l.; *P. Núñez 6564*; F, MO [MO-2180354]. – **Cusco Region: Prov. La Convención** • Dist. Echarate, Katarompanaki; 12°11′12″ S, 72°28′13″ W; 1800 m a.s.l.; 5–8 May 2004; *N. Salinas, H. Beltrán, R.B. Foster & C. Vriesendorp 7038*; USM • Dist. Maranura, Mesa Pelada; 12°32′ S, 72°22′ W; 2547 m a.s.l.; 20 Apr. 2005; *L. Valenzuela, E. Sucllli, I. Huamantupa, J. Farfán, L. Cárdenas, V. Chama & J. Latorre 5528*; MO [MO-2153577], US [US00932203] • Santa Teresa, Yanatile; 13°05′ S, 72°24′ W; 2269–2800 m a.s.l.; 17 Apr. 2005; *L. Valenzuela, E. Sucllli, I. Huamantupa, J. Farfán, L. Cárdenas, V. Chama & J. Latorre 5428*; MO [MO-2991356]. – **Prov. Calca** • Dist. Lares; 12°28′ S, 71°35′ W; 2634 m a.s.l.; 16 Jun. 2005;

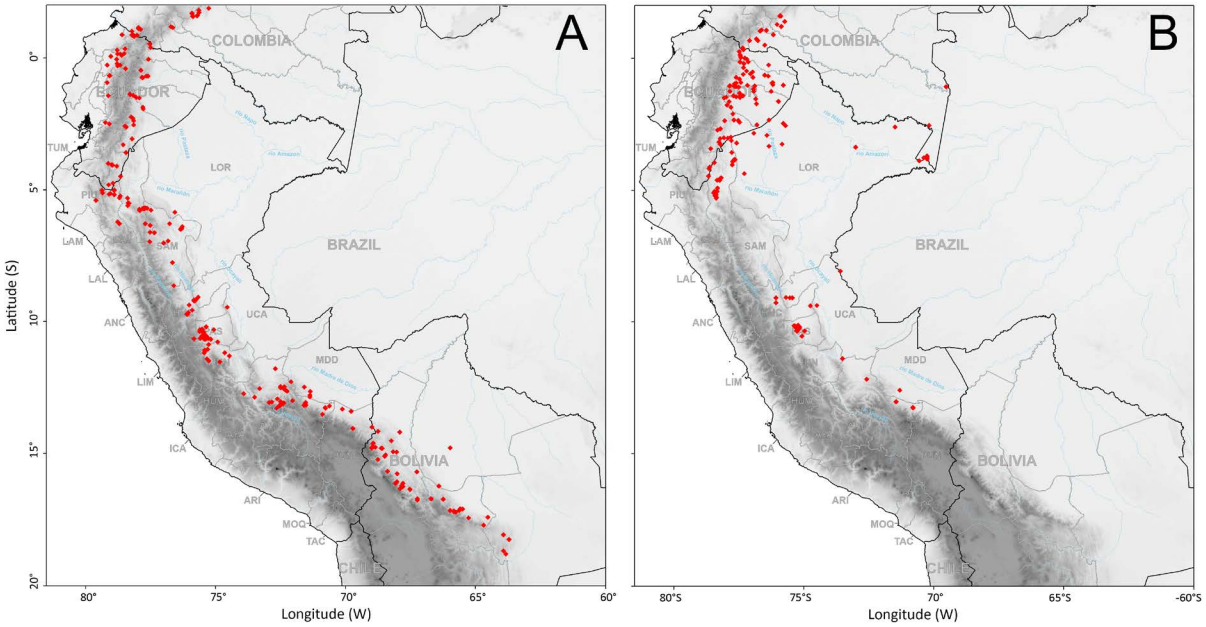


**Fig. 81.** Distribution of *Begonia* sect. *Pritzelia* (Klotzsch) A.DC. and *B.* sect. *Rossmannia* (Klotzsch) A.DC. in Peru and surrounding countries. **A**. *B. parviflora* Poepp. & Engl. (red). **B**. *B. rossmanniae* A.DC. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

*L. Valenzuela, E. Suclli, I. Huamantupa, J. Farfán, N. Anaya, H. Coasaca & J. Tito 5654*; MO [2: MO-1664125, MO-1664131] • Lacco Yabero; 12°29′24″ S, 72°29′45″ W; 2278 m a.s.l.; 15 Jun. 2004; *L. Valenzuela, E. Suclli, I. Huamantupa & J. La Torre 3819*; MO [MO-1664187], US [US00900518] • Road Quebrada-Alto Lacco; 12°37′22″ S, 72°14′40″ W; 2800 m a.s.l.; 1 May 2006; *H. van der Werff, L. Valenzuela, E. Suclli & A. Carazas 21235*; MO [2: MO-1839282, MO-1839283]. – **Prov. Urubamba** • Dist. Ollantaytambo, road from Quillabamba to Ollantaytambo; 13°01′39″ S, 72°28′54″ W; 1920 m a.s.l.; 7 Aug. 2014; *P.W. Moonlight & A. Daza 93*; E [E00724458], MOL, USM • Intipunco, a la altura de km 107, en la vía ferroriaría Cusco-Quillabamba; 13°09′ S, 71°31′ W; 2900 m a.s.l.; 29 Oct. 1987; *P. Núñez & J. Arque 8445*; MO [MO-1641632] • A 110 km de Cusco entre Hidroeléctrica del 107 al km 112 en Machupicchu y Aguas Calientes; 13°09′10″ S, 72°31′ W; 2000 m a.s.l.; 28 Nov. 1987; *P. Núñez V. 8672*; MO [MO-1835952]. – **Prov. Paucartambo** • Santa Isabel; [13°02′ S, 71°32′ W]; 23–30 Jul. 1948; 1200 m a.s.l.; *J.C. Vargas Calderón 7327*; MO [MO-1641296] • río La Unión; [13°05′ S, 71°33′ W]; 1700–1800 m a.s.l.; 10 Sep. 1991; *B. León, K. Young & N. Huapaya 2883*; USM • km 51 of road from Paucartambo to Pilcopata; 13°09′26″ S, 71°35′40″ W; 2388 m a.s.l.; 4 Aug. 2014; *P.W. Moonlight & A. Daza 81*; E [E00724457], MOL, USM. – **Prov. Quispicanchis** • Dist. Marcapata, Limacpunko, Community of Unión Arasa, Cullebrayoc trail; 13.4952°S, 70°8869°W; 2366–2434 m a.s.l.; *J.D. Wells & P. Centeno 965*; USM • 16.6 km from Quincemil on road to San Lorenzo; [13°11′ S, 70°37′ W]; ca 390 m a.s.l.; 11 Jun. 1960; *H.E. Moore, A. Salzar C. & E.E. Smith 8585*; USM. – **Ayacucho Region: Prov. La Mar** • Dist. Anco, Camino de Chinquintirca a Toccate, altura de los km 206-207 del gaseoducto; 2300–2400 m a.s.l.; 24 Mar. 2005; *J. Roque 4483*; USM. – **Puno Region: Prov. Carabaya**

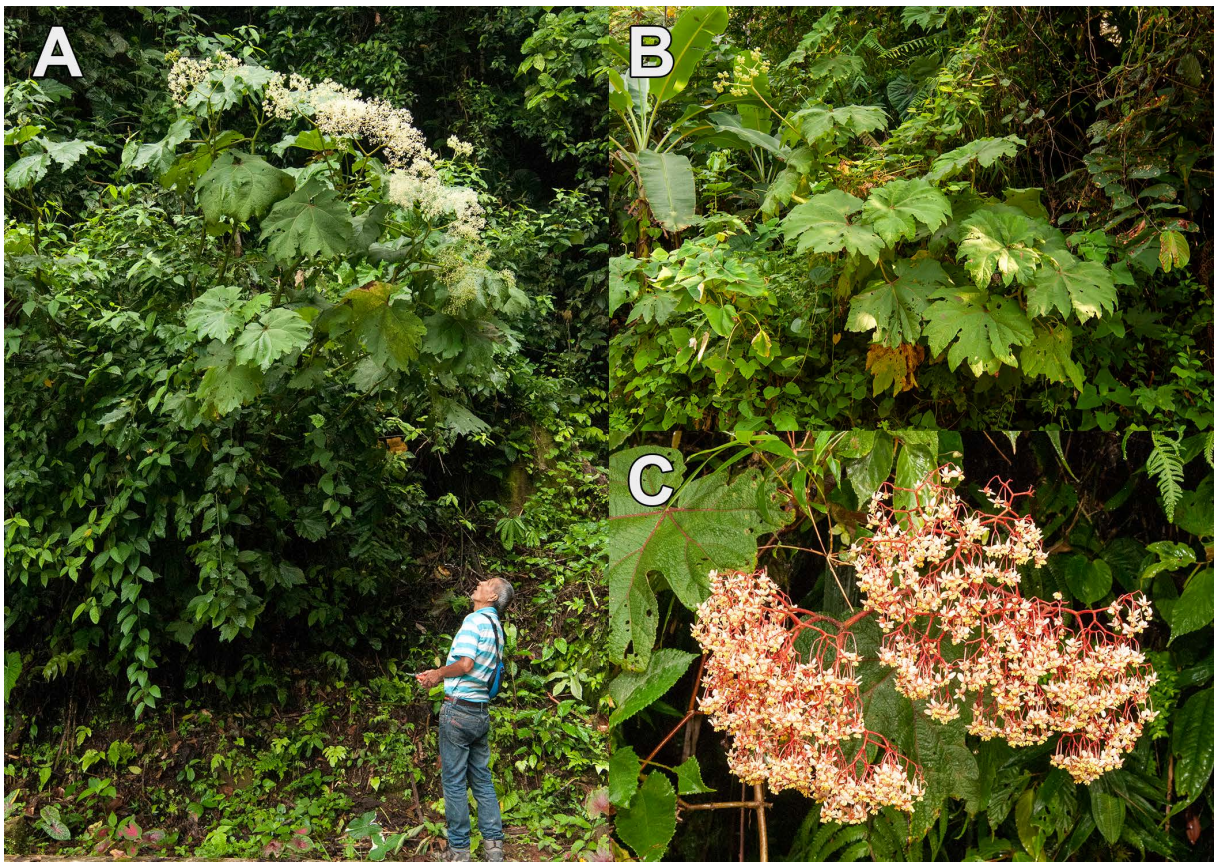


**Fig. 82.** *Begonia parviflora* Poepp. & Endl. **A**. Habitat. **B**. Habit. **C**. Inflorescence. All photographs taken by P.W. Moonlight from *P.W. Moonlight 137* (B) in Bagua Province, Amazonas, Region, *149* (C) in Bongará Province, Amazonas Region, and *171* (A) in San Martín Province, San Martín Region.

• Cabeceras de río Candamo;13°18′ S, 70°07′ W; 800 m a.s.l.; 15 Nov. 1996; *F. Cornejo V. & A. Balarezo 2703*; MO [2: MO-1641634, MO-1641635]. – **Prov. Sandía** • Dist. San Juan del Oro, Pampa Grande; 13°58′54.8″ S, 68°58′45.5″ W; 1347 m a.s.l.; 25 Feb. 2003; *V. Ayala, P. Masco, I. Mamani, F. Mamani, J. Chambi & V. Ccapayqui 138*; MOL • 2–6 km from Oconeque; [14°02′ S, 69°43′ W]; 1800–2100 m a.s.l.; 22–25 May 1942; *R.D. Metcalf 30600*; MO [MO-1641294].

**Description**

Caulescent herb, to 10 m high. *Stem* erect, branching; internodes to at least 15 cm long, to 5 cm thick, succulent to appearing woody, pale green to brown, indumentum. *Stipules* deciduous, lanceolate, 6–20 × 3–6 mm, apex acute, opaque, pale green, glabrous to glandular-pilose, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 2–45 cm long, pale green to red, indumentum; blade asymmetrical, ovate in outline, very rarely lanceolate in immature plants, to at least 50 × 50 cm, chartaceous, apex acute to acuminate, base cordate, basal lobes rounded, sinus to at least 10 cm deep, margin with 3–5 irregular, triangular lobes around the edge of the lamina, rarely lacking lobes in immature plants, dentate, ciliate, upper surface green to purple, glabrous to densely glandular-pilose, lower surface pale green to red, sparsely pilose to densely pilose on the veins, veins palmate, 4–6 veined from the base, irregularly branching. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 12 branches, bearing up to at least 1000 staminate flowers and 500 pistillate flowers, protandrous; peduncle to at least 30 cm long, white, green, red, or brown, sparsely to densely glandular pilose, bracts deciduous, broadly lanceolate, 3–8 × 1–5 mm, opaque, pale green, sparsely to densely glandular pilose, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 6 mm long, sparsely to densely glandular pilose; tepals 4, spreading, ovate, 1–3 × 0.5–2 mm, apex rounded, white to pink, glabrous to sparsely glandular-pilose on the outer surface, margin entire, ciliate; stamens 40–75, spreading, pale to bright yellow, filaments 0.5–1.5 mm long, free, anthers cuboid to ellipsoid, 0.25–0.75 × 0.25 mm, dehiscing via lateral slits, connectives not extended to extending to ca 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 10 mm long; bracteoles 1, directly beneath the ovary, lanceolate, 1–1.5 × 0.5 mm, apex obtuse, opaque, white, glabrous, margin lacerate, ciliate; tepals 5, subequal, deciduous in fruit, spreading, lanceolate, 1–5 × 0.5–2 mm, acute, white to pink, glabrous to occasionally densely glandular-pilose at the base, margin entire to laxly serrate, aciliate; ovary body broadly ovate, 1–2 × 1–3 mm, white, densely glandular-pilose, sub-equally 3-winged, wings a < 1 mm wide ridge; 3-locular, placentae branches entire, bearing ovules on both surfaces; styles 3, yellow, free, 2–3 mm long, 2-lobed, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 1 cm long. *Fruit body* broadly ovoid, to 4 × 5 mm, drying brown, wings expanding to semi-circular wings, to 12 × 9 mm.

**Proposed conservation assessment**

Widespread and common to dominant throughout its Peruvian and global range, which includes many protected areas. We assess *B. parviflora* as Least Concern (LC).

**Typification notes**

*Begonia parviflora* was described from material collected by E.F. Poeppig in Pampayaco, Huánuco Region, Peru (Poeppig & Endlicher 1835: 7). We have not seen any herbarium specimens matching this material, but any such specimens are most likely held in Vienna. We refrain from designating a type while it is unclear whether any syntypes exist.

The protologue of *B. micrantha* Steud. is included in a checklist citing names and their synonyms (von Steudel 1840: 194). *Begonia parviflora* is cited as a synonym of this name, thus *B. micrantha* Steud. is a superfluous name of *B. parviflora*. The type of *B. parviflora* is not explicitly excluded from the author's concept of *B. micrantha* so *B. micrantha* has the same type as *B. parviflora* (Turland *et al.* 2018: Article 7.5).

### Identification notes

When mature, this species is unmistakable among Peruvian *Begonia* species, as the only non-scrambling or climbing species reaching > 5 m in height and with its leaves usually double the size of any other Peruvian *Begonia* species. Furthermore, it has the largest inflorescences in the genus, frequently holding > 1000 flowers. Young, sterile plants may however be difficult to distinguish from other lobed-leaved species, including *B. monadelpha*, *B. arrogans*, or *B. acerifolia*. It is best distinguished by its indumentum of glandular-pilose hairs, which is always present on young stems and usually present on the leaves. These hairs give *B. parviflora* a rough, sandpaper-like texture. This character also holds in the rare cases when the species has unlobed, lanceolate leaves (e.g., *P.W. Moonlight & A. Daza 155*).

### Distribution and ecology

Known from Costa Rica, Panama, Colombia, Ecuador, Peru and Bolivia. Within Peru, it is found in Loreto, Amazonas, Piura, Cajamarca, San Martín, Ucayali, Huánuco, Pasco, Junín, Madre de Dios, Cuzco, Ayacucho and Puno Regions (Fig. 81A). Known from Amazonia, lower, middle, and upper montane forest, and northwest Peruvian relict montane forest at an elevation of 200–2950 m a.s.l. *Begonia parviflora* is locally common to dominant in recently disturbed montane forest, such as landslide scars, stream banks, and forest edges. It is rarely encountered in undisturbed montane forest. The species is most likely wind pollinated.

## ***Begonia*** sect. ***Rossmannia*** (Klotzsch) A.DC.

*Prodromus Systematis Naturalis Regni Vegetabilis* 15(1): 333 (de Candolle 1864). – *Rossmannia* Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 125 (Klotzsch 1854). – **Type**: holotype: *Rossmannia repens* Klotzsch ≡ *Begonia rossmanniae* A.DC.

### Notes

*Begonia rossmanniae* A.DC. is the only member of this section and is found in the Amazonian forests of Colombia, Ecuador, Peru, and Brazil. It is most closely related to *B.* sect. *Pilderia* (Moonlight & Jara-Muñoz 2017), sharing with this section a terminal, thyrsoid inflorescence. Unlike members of *B.* sect. *Pilderia*, *B. rossmanniae* is completely glabrous and has conspicuously 3-veined leaves.

### 65. ***Begonia rossmanniae*** A.DC.
Figs 3C, 7F, 81B, 83

*Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 333 (de Candolle 1864). – *Rossmannia repens* Klotzsch, *Gattungen und Arten* 1854: 219 (Klotzsch 1855). – **Type**: PERU – **[Huánuco Region: Prov. Huánuco]** • Pueblo Nuevo; [9°05′ S, 76°04′ W]; *H. Ruíz, J.A. Pavón & J.J. Tafalla Navascués s.n.*; lectotype: B [B100243068, F neg. 20860], **designated here**; isolectotype: G [rpcl 61].

Walpers (1858: 918); de Candolle (1864: 333); Smith & Schubert (1941a: 199, 1946b: 103, 1952: 39); Smith & Wasshausen (1979: 243, 1986: 32); Brako & Zarucchi (1993: 194); Vásquez *et al.* (2005: 112–125).

*Rossmannia repens* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 125 (Klotzsch 1854).

*Begonia repens* Ruiz ex Klotzsch (nom. inval.; nom. rej. pro syn. *Rossmannia repens* Klotzsch (nom. inval.; nom. nud.)), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 125 (Klotzsch 1854).

**Etymology**

This species was originally placed in the genus *Rossmannia* Klotzsch by Johann Friedrich Klotzsch. When it was transferred to the genus *Begonia*, Alphonse Pyramus de Candolle chose to use the epithet *rossmannia* as a nom. nov. The genus *Rossmannia* and epithet of the species both honour Julias Rossmann, a botanical lecturer at the Giessen University.

**Selected specimens examined**

PERU • *H. Ruiz & J.A. Pavón s.n.*; G • 1778–1788; *H.A. Ruiz & J.A. Pavón s.n.*; MA [MA813504, mixed collection]. – **Loreto Region: Prov. Putumayo** • Dist. Putumayo, Campamento 1 (Quebrada Bufeo) del Inventario Rápido Biológico y Social 28, alturas entre el río Putumayo y la quebrada Mutún, 3.8 km al suroeste de la Cocha Bufe; 2°19′50.2″ S, 71°36′27.1″ W; 90–145 m a.s.l.; 5 Feb. 2016; *M. Ríos, A. Barona, N. Pitman, L. Torres & C. Vriesendorp 5262*; USM • río Tigre, San Jacinto, campamento de Occidental Petroleum, ca 30 km arriba de Bartra, ca 20 km arriba de Marsella, ca 20 km abajo del frontera con Ecuador, 0.5 km al E del campamento; 2°28′ S, 75°47′ W; 175–205 m a.s.l.; 10 Jun. 1993; *H. Beltrán & R.B. Foster 453*; USM • Tigre, río Tigre, 2°33′ S, 75°42′ W; 18 Mar. 1974; *S. McDaniel & M. Rimachi Y. 18428*; MO [MO-1641408], NY, US [US00424977], USM. – **Prov. Loreto** • Viernes Santos; 13 Apr. 1979, *J. Aronson & J. Rios de Aguilar 905*; MO [MO-1643484] • Pampa Hermosa and vicinity, río Corrientes, 1 km S of junction with río Macusari; 3°15′ S, 75°50′ W; 160 m a.s.l.; 3–20 Dec. 1985; *W.H. Lewis, M. Elvin-Lewis & M.C. Gnerre 9995*; MO [MO-2340413], USM. – **Prov. Alto Amazonas** • Puranchim, río Shichiyacu; 2°50′ S, 76°55′ W; 200 m a.s.l.; 21–27 Nov. 1986; *J. Campos & D. Fast 11901*; MO [MO-2340410], USM • Along río Aguaytía above mouth of quebrada Yurac-Yacu; [3°22′ S, 73°00′ W]; 2 Oct. 1972; *T.B. Croat 20897*; MO [MO-2180421] • Pijuayal, quebrada Tiriima, 1 km S on río Morona and 4 hours by outboard NE of jct. of ríos Pushaga and Morona; 4°22′ S, 77°17′ W; 150 m a.s.l.; *W.H. Lewis, M. Elvin-Lewis, D. Fast W. & J.R. Campos 12970*; MO [MO-2340408], USM. – **Prov. Datem del Marañón** • Campamento Sgto. Puño, 3°12′33″ S, 77°35′02″ W; 205 m a.s.l.; 20 Sep. 2010; *E. Becarra G. 3078*; USM. – **Amazonas Region: Prov. Condorcanqui** • Dist. Santiago, Cerros Kampankis, Serranía entre los ríos Santiago y Morena, desde río Marañón hasta frontera con Ecuador; 3°07′01.52″ S, 77°46′55.14″ W; 520 m a.s.l.; 3 Aug. 2011; *I. Huamanutupa, D. Neill, N. Pitman & C. Kakekai 15152*; F [V0386829F], USM • Dist. El Cenepa, Comunidad Aguaruna Pagki-Suwa, río Cenepa; 4°31′35″ S, 78°10′34″ W; 289 m a.s.l.; *R. Vásquez, R. Rojas, A. Peña, E. Chávez & E. Quiaco 22103*; HUT, MO [MO-286242], US [US00672883], USM • Dist. El Cenepa, Comunidad de Mamayaque, quebrada Chinim, 4°37′01″ S, 78°19′58″ W; 600 m a.s.l.; 15 Aug. 1997; *R. Vásquez, R. Rojas, A. Peña, E. Chávez & E. Quiaco 24592*; HUT, MO [MO-286224], US [US00672884], USM. – **Prov. Bagua** • Dist. Imaza, Comunidad Nativa Yamayakat; 4°55′ S, 78°19′ W; 300 m a.s.l.; Jan. 1995; *V. Hodges & J. Gorham 46*; HUT, MO [MO-286211], US [US00672893] • 3 km E of Chiriaco; [5°10′ S, 78°22′ W]; 260 m a.s.l.; 10 Feb. 1978; *D.C. Wasshausen & F. Encarnación 881*; K, MO [MO-1641422], US [US00222279], USM • Mesones-Muro highway 18 km below Montenegro, on the E side of the Abra Huahuajin; [5°18′ S, 78°22′ W]; 700 m a.s.l.; 21 Jan. 1964; *P.C. Hutchinson & J.K. Wright 3648*; K, MO [MO-1641412], NY, US [US00222283], USM. – **Ucayali Region: Prov. Padre Abad** • Dist. Padre Abad: Boquerón de Padre Abad; [9°04′47″ S, 75°41′ W]; 500 m a.s.l.; 25 Mar. 1962; *J. Schunke V. 5819*; K, MO [MO-1641404], US [US00222281], USM • Dist. Padre Abad, Cuenca del río Aguaytía, carretera Centro Poblado Yuric, margen izquierda río Yurmac; 9°05′ S, 75°32′ W; 250–300 m a.s.l.; 28 Sep. 2004; *J. Schunke V. & J.G. Graham 16127*; F [V0088034F], G, MOL [2], US [US01008614] • Dist. Padre Abad, Cuenca del río Aguaytía, carretera al caserio San Miguel y Mapuya, 12 a 17 km de la Aguaytía; 9°05′ S, 75°26′ W; 250–300 m a.s.l.; 10 Aug. 2004; *J. Schunke V. & J.G. Graham 16305*; F [V0088032F], G [2], MOL, US [US01008616]. – **Prov. Coronel Portillo** • Dist. Iparía, Cuenca del río Ucayali; 9°22′20″ S, 74°29′20″ W; 220 m a.s.l.; *J.G. Graham & J. Schunke V. 4366*; MOL, US [US01008611]. – **Huánuco Region: Prov. Leoncio Prado** • Agua Blanco, carretera Monzón; [9°16′ S, 76°05′ W]; 22 Apr. 1962; *J. Schunke V. 5865*; MO [MO-1641434], US [US00222285], USM • Vicinity of Tingo María, Monzón

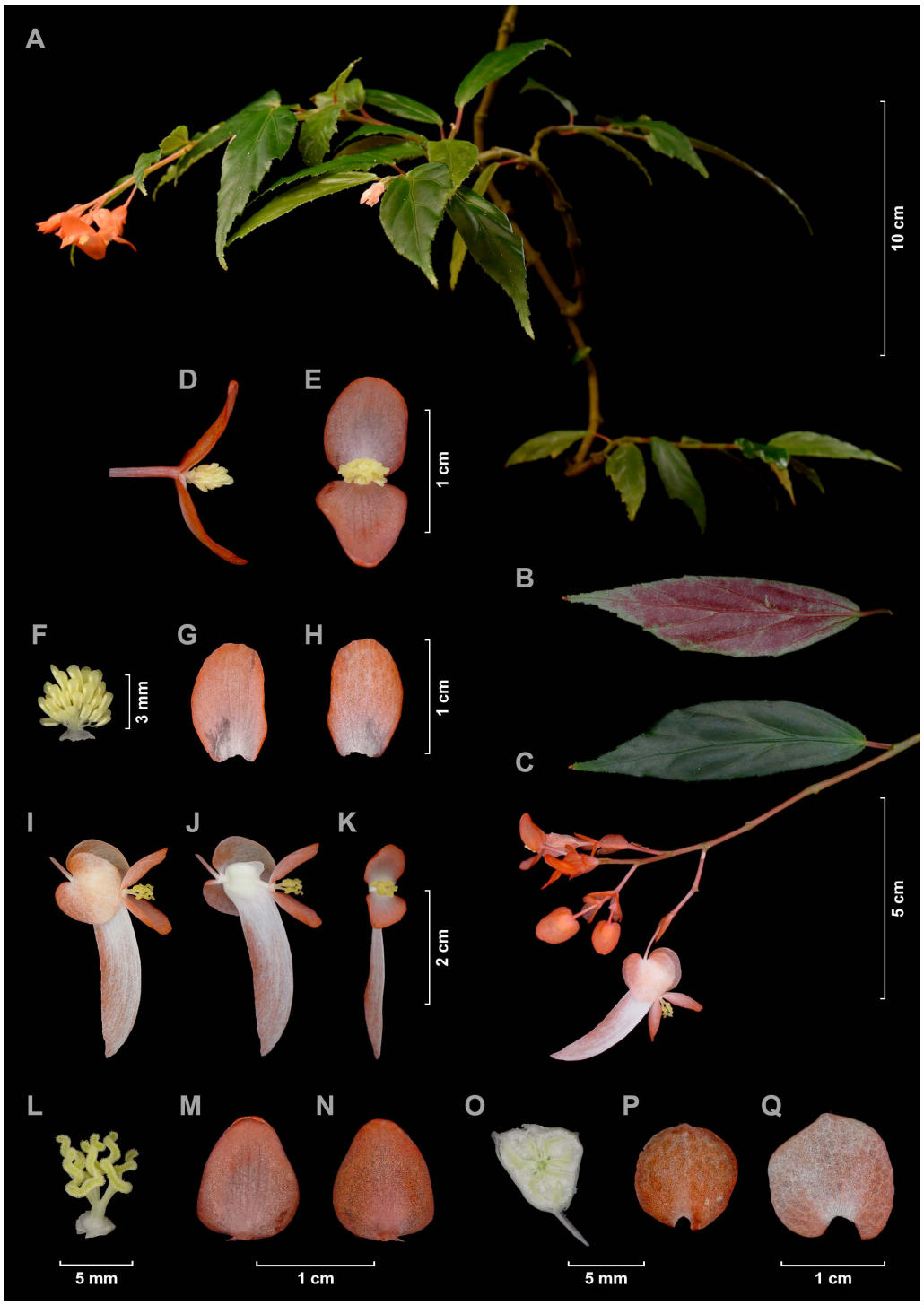


**Fig. 83.** *Begonia rossmanniae* A.DC. **A**. Habit. **B**. Leaf, abaxial surface. **C**. Inflorescence and leaf, adaxial surface. **D**. Staminate flower, side view. **E**. Staminate flower, front view. **F**. Androecium, side view. **G**. Tepal of the staminate flower, front view. **H**. Tepal of the staminate flower, back view. **I**. Pistillate flower, side view. **J**. Pistillate flower, side view with bracteole removed. **K**. Pistillate flower, front view. **L**. Pistils, side view. **M**. Tepal of the pistillate flower, front view. **N**. Tepal of the pistillate flower, back view. **O**. Cross section of the ovary. **P**. Bract. **Q**. Bracteole. All photographs taken by D.A. Purvis in the living collections of the Royal Botanic Garden Edinburgh (Accession 20160141, grown from seeds collected as part of *P.W. Moonlight & A. Daza 315*).

road to Puñulla; 25 Jun. 1952, *M.E. Matias & D. Taylor 5422*; K, US [US00222284], USM. – **Pasco Region: Prov. Oxapampa** • Dist. Palcazú, Comunidad Nativa Santa Rosa de Chuchurras; 10°07′45″ S, 75°12′54″ W; 300 m a.s.l.; 11 Nov. 2008; *M. Huamán, R. Rivera, H. Bautista & B. Bautista 403*; HOXA, MO [MO-2425994], USM • Dist. Palcazú, río Alto Izcosacín, Ozuz, 10°19′ S, 75°16′ W; 400–500 m a.s.l.; 8 May 1985; *R.B. Foster & B. D'Achille 9955*; K, MOL, US [US00424976] • Along road Chatarra-Puerto Bermúdez; 10°32′ S, 75°04′ W; 890 m a.s.l.; *H. van der Werff, R. Vásquez, B. Gray, R. Ortiz & N. Davilla 18387*; HOXA, MO [MO-1102984], US [US00843966]. – **Prov. Puerto Inca** • Reserva Comunal el Sira (parcela permanente 3, RAINFOR); 11°24′38″ S, 74°39′59″ W; 1568 m a.s.l.; 1 May 2011; *L. Valenzuela, D. Heredia, A. Furo, L. López, E. Díaz, E. Zans & V. Moreno 18467*; HOXA. – **Junín Region: Prov. Satipo** • río Tambo; 11°23′01″ S, 73°30′21″ W; 492 m a.s.l.; 11 Oct. 2012; *E. Chilquillo, R. Soplin & J. Alarcon ECH619*; USM. – **Madre de Dios Region: Prov. Manu** • C.N. Yornybato, across Yornybato, Quispe's path; 23 Nov. 1996; *M.I. Toribio 120*; USM • Cerro de Pantiacolla, río Palotoa • 10–15 km NNW of Shintuya, transect to ridgetop; 12°35′ S, 71°18′ W; 650–700 m a.s.l.; 12 Dec. 1985; *R.B. Foster, R. Fernandez & E. Vivar 10732*; F, US [US00424978], USM. – **Cusco Region: Prov. La Convención** • Dist. Echarate, Kapiromashi; 12°09′48″ S, 72°34′31″ W; 750 m a.s.l.; 26–30 Apr. 2004; *N. Salinas, H. Beltrán, R. Floster & C. Vriesendorp 6550*; USM. – **Prov. Paucartambo** • entre Mistiana y Keros; [13°01′ S, 71°26′ W]; 700 m a.s.l.; Jul. 1948; *J.C. Vargas Calderón 7377*; US [US00222288] • Kosñipata; [13°01′ S, 71°27′ W]; 800 m a.s.l.; 27 Apr. 1914; *A. Weberbauer 6939*; MOL [2].

### Description

Caulescent herb, to 3 m high. *Stem* scandent, branching, rooting at the nodes; internodes to 4.5 cm long, to 4 mm thick, succulent, red, glabrous. *Stipules* deciduous, lanceolate, 3.5–9 × 1–3 mm, apex acute to acuminate, opaque, green to red, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 0.5–2 cm long, green to red, glabrous; blade subsymmetric, elliptic, to 12 × 3.5 cm, succulent, apex acuminate, base cuneate, rarely rounded or cordate on the broader side of the blade, margin denticulate to dentate, ciliate, upper surface green, glabrous, lower surface pale green to red, glabrous, 3-veined from the base, with 4–6 secondary veins on the larger side, 4–6 secondary veins on the smaller side. *Inflorescences* 1 per stem, bisexual, terminal, erect, thyrsoid, with ca 3 lateral branches, bearing up to 10 staminate flowers and 5 pistillate flowers, protandrous; peduncle to 2.5 cm long, green to red, glabrous, bracts persistent, oblanceolate, 5–8 × 3–5 mm, translucent, white, pink, orange or red, glabrous, apex truncate to acute, margin entire to rarely lacerate at the apex, aciliate. *Staminate flowers*: pedicels to 10 mm long, glabrous; tepals 2, spreading, lanceolate to broadly ovate, 8–10 × 5–7 mm, apex acute, white, pink, orange or red, glabrous, margin entire, aciliate; stamens ca 25, projecting, pale yellow, filaments 0.5–2 mm long, fused at the base, anthers cuboid, 0.8–2 × 0.5–0.8 mm, dehiscing via lateral slits, connectives extended to 0.3 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 18 mm long; bracteoles 2, positioned directly beneath the ovary, broadly ovate, 10–15 × 14–18 mm, apex rounded, translucent, white, pink, orange or red, glabrous, margin entire to rarely dentate at the apex, aciliate; tepals 2, equal, late-deciduous in fruit, projecting, lanceolate, 8–10 × 4–5 mm, acute, white, pink, orange or red, glabrous, margin entire, aciliate; ovary body broadly obovoid, 4–6 × 4–6 mm, white, pink, orange or red, glabrous, unequally 3-winged, largest wings paddle shaped, to 10 × 40 mm, smallest marginal, to 2 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, pale yellow, free, 4–5 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 25 mm long. *Fruit body* obovoid, to 8 × 8 mm, drying brown, wings same shape as in ovary, the largest expanding to 15 × 50 mm, the smallest expanding to 5 mm wide.

**Proposed conservation assessment**

Widespread and locally common throughout its large range (EOO of > 1 000 000 km$^2$), which includes several Colombia, Ecuadorian and Peruvian protected areas. We assess *B. rossmanniae* as least concern (LC).

**Typification notes**

The protologue for *B. rossmanniae* cites Klotzsch's earlier name *Rossmanniae repens* as a synonym (de Candolle 1864: 333). The name *B. repens* was unavailable due to the earlier publication of *B. repens* Lam. (Lamark 1785). *Rossmannia repens* is therefore the basionym of *B. rossmanniae*, which is a nom. nov.

The protologue of *Rossmanniae repens* cites collections made by Ruiz and Pavón in Pueblo Nuevo, which were "discovered and drawn by von Tafalla" (Klotzsch 1855: 219). J.J. Tafalla y Navascués was a botanist that joined the Ruiz and Pavón expedition on the 14$^{th}$ of November 1784 (Dahlgren 1940: 185). Two sheets of *B. rossmanniae* are known that have labels written in Tafalla's hand stating they were collected in Pueblo Nuevo: one housed in B (B100243068) and a second in G. Klotzsch's handwriting is also on the label on the specimen in B, and we therefore designate this specimen the lectotype of *R. repens* Klotzsch. It is unclear to whom this specimen should be attributed. As discussed by Tepe (2018), it is usually impossible to determine whether collections made on the Ruiz and Pavón expedition were made by Tafalla, Ruiz or Pavón, or some combination of the three collectors. The expedition visited Pueblo Nuevo before Tafalla joined (Dahlgren 1940: 71) but likely also visited afterwards. While Ruíz's diaries state that they described "*Begonia repens*" before Tafalla joined the expedition (Dahlgren 1940: 178) it is unclear to which species they were referring. A collection labelled as "*Begonia repens*" collected by the expedition and housed in Madrid (MA813504) is a mixed collection of *B. glabra* and *B. rossmanniae*. The earlier description of *"Begonia repens"* may therefore refer to *B. glabra*. Accordingly, we attribute the type specimen of *R. repens* and its duplicate in Geneva to Ruíz, Pavón and Tafalla.

It is worth noting that Smith & Wasshausen (1979) cited a specimen collected by Ruiz and Pavón and housed in BM as the holotype of *B. rossmanniae*. If such a specimen existed, this would constitute an effective lectotypification. Unfortunately, there is no such specimen nor any evidence that one existed. Most likely, Smith & Wasshausen (1979) misunderstood the protologue of *B. rossmanniae*, which states that specimens of this species were discovered by Tafalla, that he illustrated it, and that this illustration is in BM. It does not state that any specimens are in BM. We have been unable to locate any such specimen or any illustrations by Tafalla in BM.

**Identification notes**

*Begonia rossmanniae* is one of the few species of Peruvian *Begonia* with lanceolate, basifixed leaves and a climbing habit. When flowering, it is trivial to recognise the species as it has orange or red flowers (rather than white). The pair of large, heart-shaped bracteoles that obscure the ovary are also unique to this species. When sterile, the species could be confused with *B. peruviana* but differs in its venation. Both species have pinnate veins but *B. rossmanniae* also has three main veins from its base. This venation is shared with *B. glabra* but this species generally has persistent stipules and broadly ovate to rounded leaves, while the stipules of *B. rossmanniae* are deciduous and its leaves are lanceolate. Finally, *B. rossmanniae* could be confused with *B. aeranthos* but this species has sub-peltate leaves.

**Distribution and ecology**

Known from Peru, Ecuador, Colombia, and Brazil. Within Peru, it has been collected in Loreto, Amazonas, Ucayali, Huánuco, Pasco, Junín, Madre de Dios, and Cusco Regions (Fig. 81B). Found in Amazonian and lower montane forest at an elevation of 90–900 m a.s.l. It is most frequently collected

as an epiphyte on moss-covered stems from 5–20 m from the ground. It has also been observed growing as a terrestrial herb in Ecuador (personal observation) and likely does in Peru too. Its red, pendulous flowers suggest *B. rossmanniae* may be visited by hummingbirds, but to date no pollination observations have been recorded and the species does not provide a nectar reward.

### ***Begonia*** sect. ***Ruizopavonia*** A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 139 (de Candolle 1859). – **Type**: holotype: *Begonia alnifolia* A.DC.

**Notes**

*Begonia* sect. *Ruizopavonia* was described by de Candolle to accommodate several Andean species with two tepals on both the staminate flower and pistillate flower, bifid placentae, and bifid styles. Its circumscription has been periodically altered since. Doorenbos *et al.* (1998) expanded the section to include some species with five tepals but moved all species with transversely ovate leaves to *B.* sect. *Cyathocnemis*. Moonlight *et al.* (2018) further refined the concept, moving species with indistinct venation to *B.* sect. *Lepsia* and favouring a distinction between palmate-pinnate venation and pinnate venation over a distinction between transversely ovate and straight leaves. Most members of this section are easily recognised as pinnately veined species with two tepals on both the staminate and pistillate flower.

Throughout the process of producing this account and a checklist of Bolivian *Begonia* (Moonlight & Fuentes 2022), it has become increasingly clear that the current circumscription of *B.* sect. *Ruizopavonia* is untenable. Doorenbos *et al.* (1998) included several Bolivian species in the section, which differ from the section sensu stricto in their multifid styles, dense indumentum, and palmate-pinnate venation (*B. buchtienii* Irmsch.). Several members also differ in their pistillate flower with five tepals. These species have not yet been included in any molecular phylogenies so Moonlight *et al.* (2018) tentatively assigned them to *B.* sect. *Ruizopavonia*. In this account, we describe *B. nunezii* sp. nov., which has bifid styles, but is clearly closely related to the Bolivian species by virtue of its dense indumentum, palmate-pinnate venation, and five tepals on the pistillate flower. We tentatively assign *B. nunezii* sp. nov. to *B.* sect. *Ruizopavonia*.

We recognise four species of *B.* sect. *Ruizopavonia* within Peru. This includes two newly described species and one new record for the country. We also recognise much increased circumscriptions of *B. glauca* (Klotzsch) Ruiz & Pav. ex A.DC. and *B. peruviana*, each including four newly proposed synonyms.

#### 66. ***Begonia glauca*** (Klotzsch) Ruiz & Pav. ex A.DC.
Figs 1E, 84A, 85

*Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 330 (de Candolle 1864). – *Pritzelia glauca* Klotzsch, *Gattungen und Arten* 1854: 229 (Klotzsch 1855). – **Type**: PERU – **[Huánuco Region: Prov. Huánuco]** • Muña; [9°40′ S, 75°49′ W]; 1785, *H. Ruiz & J.A. Pavón s.n.*; lectotype: G-DC ex G-BOIS [F neg. 7341], **designated here**.

Walpers (1858: 923); de Candolle (1864: 330); Smith & Schubert (1941a: 191); Irmscher (1949: 579); Brako & Zarucchi (1993: 192); León & Monsalve (2006: 166).

*Begonia viridiflora* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 133 (de Candolle 1859). – **Type**: PERU – **Huánuco Region: [Prov. Huánuco]** • Cuchero; [9°30′ S, 75°56′ W]; *E.F. Poeppig 1063*; lectotype: W [W18890111306], **designated here**; isolectotypes: B [B100366034], G-DC, W [W0021904] • Prov. Huánuco: route from Tingo María to Carpish, ca 1 km above Carpish;

9°39′18″ S, 76°03′19″ W; 2045 m a.s.l.; 10 Feb. 2016; *P.W. Moonlight & A. Daza 217*; epitype: MOL, **designated here**; isoepitypes: E [E00879842, E00885557], G, MO [MO-3254810]. **Syn. nov.**

de Candolle (1864: 330); Smith & Schubert (1941a: 201); Irmscher (1949: 576); León & Monsalve (2006: 170).

*Begonia viridiflora* var. *parviflora* L.B.Sm. & B.G.Schub., *Publications of the Field Museum of Natural History, Botanical Series* 13 (4/1): 202 (Smith & Schubert 1941a). – **Type**: PERU – **Huánuco Region: [Prov. Huánuco]** • Road Mirador to Chinchao; [9°38′ S, 76°04′ W]; 2300 m a.s.l.; 6 Nov. 1935; *Y. Mexia 4152*; holotype: GH [GH00068298]; isotypes: MO [2: MO-313003, MO-1835962]. **Syn. nov.**

Vásquez *et al.* (2005: 112–125); León & Monsalve (2006: 170).

*Begonia pseudoglauca* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 578 (Irmscher 1949). – **Type**: PERU – **Huánuco Region** • Cuchero; [9°30′ S, 75°56′ W]; Aug. 1829; *E.F. Poeppig s.n.*; lectotype: W [W0021881], **designated here** • ibid.; [9°30′ S, 75°56′ W]; 1830; *E.F. Poeppig s.n.*; epitype: W ex herb. Endlicher [W0021880], **designated here** • ibid.; [9°30′ S, 75°56′ W]; 1830; *E.F. Poeppig 1057*; syntype: W ex herb. Endlicher [W0021895, infructescence only]. **Syn. nov.**

Brako & Zarucchi (1993: 194); León & Monsalve (2006: 168).

*Begonia glaucoides* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 582 (Irmscher 1949). – **Type**: PERU – **Huánuco Region** • Cuchero; [9°30′ S, 75°56′ W]; Jul. 1829; *E.F. Poeppig 1057*; lectotype: W [W0021914], **designated here** • ibid.; [9°30′ S, 75°56′ W]; 1830, *E.F. Poeppig 1057*; syntype: W ex herb. Endlicher [W0021895, excluding infructescence] • *E.F. Poeppig s.n.*; syntype: WRSL [n.v.]. **Syn. nov.**

Brako & Zarucchi (1993: 192); León León & Monsalve (2006: 166).

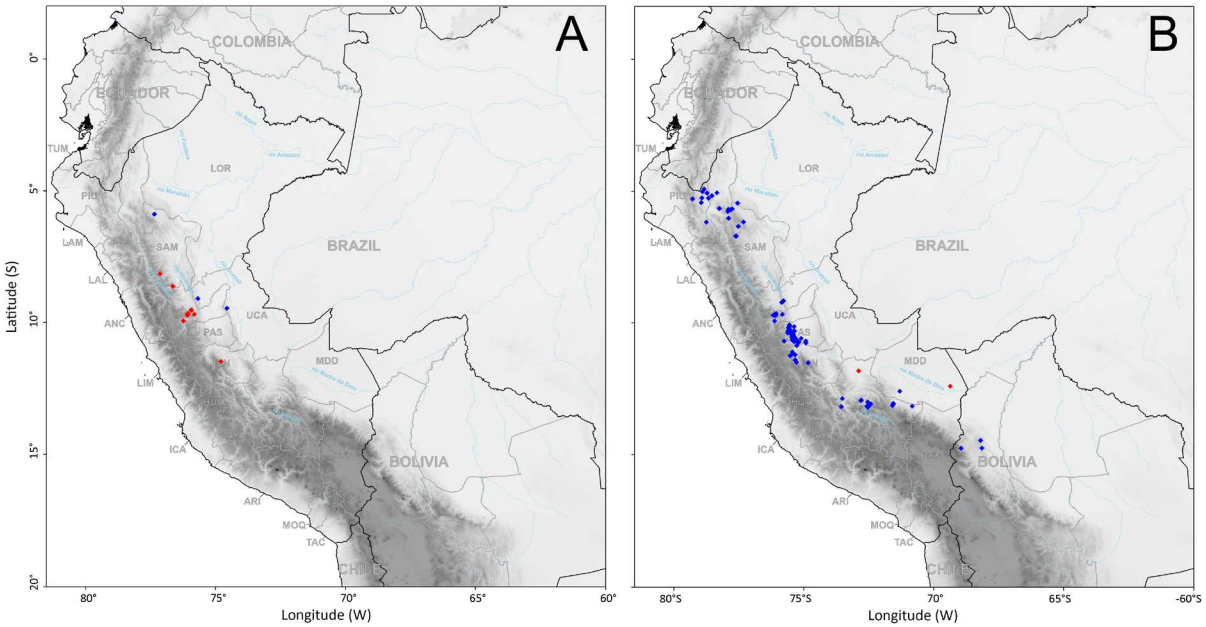


**Fig. 84.** Distribution of *Begonia* sect. *Ruizopavonia* A.DC. in Peru and surrounding countries. **A**. *B. glauca* (Klotzsch) Ruiz & Pav. ex A.DC. (red) and *B. yuracyacuensis* Moonlight sp. nov. (blue). **B**. *B. nunezii* Moonlight sp. nov. (red) and *B. peruviana* A.DC. (blue). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

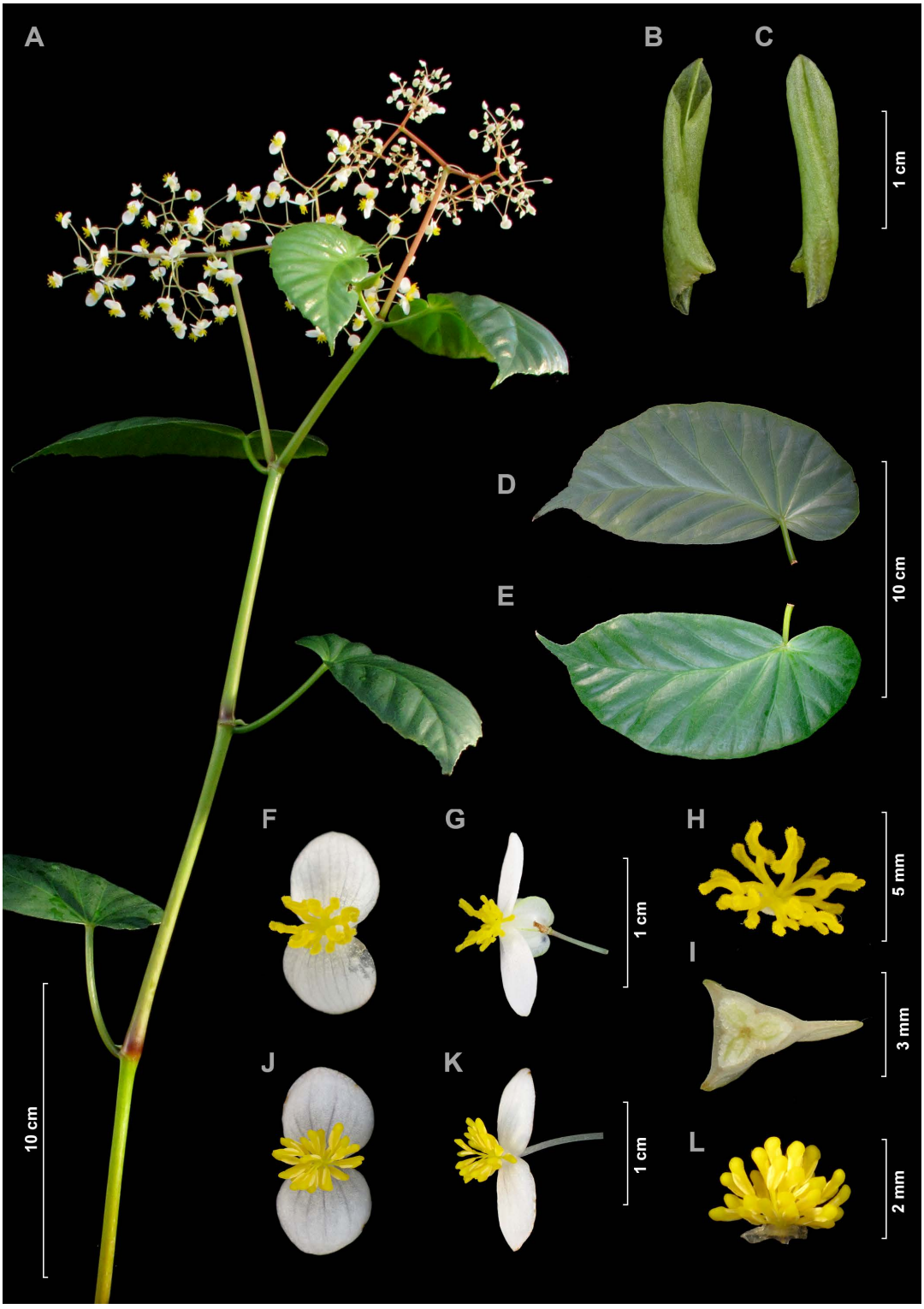


**Fig. 85.** *Begonia glauca* (Klotzsch) Ruiz & Pav. ex A.DC. **A**. Habit. **B**. Stipule, abaxial view. **C**. Stipule, adaxial view. **D**. Leaf, adaxial view. **E**. Leaf, abaxial view. **F**. Pistillate flower, front view. **G**. Pistillate flower and bracteole, side view. **H**. Pistils, front view. **I**. Section of the ovary. **J**. Staminate flower, front view. **K**. Staminate flower, side view. **L**. Androecium, side view. All photographs taken by D.A. Purvis in the living collections of the Royal Botanic Garden Edinburgh (Accession 20180174a, grown from seeds collected as part of *P.W. Moonlight & A. Daza 217*).

*Begonia glauca* Ruiz ex Klotzsch (nom. inval.; nom. rej. pro syn. *Pritzelia glauca* Klotzsch (nom. inval.; nom. nud.)), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854).

*Pritzelia glauca* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 127 (Klotzsch 1854).

*Begonia prionophylla* Irmsch. pro parte in Brako & Zarucchi, *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: 194 (Brako & Zarucchi 1993).

### Etymology

The name derives from the Greek '*glaukos*'. This refers to a dull, bluish grey-green, which is an excellent description of the colour of the leaves of some indviduals of the species.

### Selected specimens examined

PERU – **La Libertad Region: Prov. Pataz** • Valle del río Mignolle, encima de Origón; [8°08′ S, 78°08′ W]; 1800 m a.s.l.; 5 Aug. 1914; *A. Weberbauer 7052*; MOL [2]. – **Huánuco Region: Prov. Marañón** • Route W of Uchiza, 8°36′28″ S, 76°38′03″ W; 1281 m a.s.l.; 9 Feb. 2016; *P.W. Moonlight & A. Daza 206*; E [E00885562], G, MO [MO-3254805], MOL. – **Prov. Huánuco** • Cuchero; [9°30′ S, 75°56′ W]; *E.F. Poeppig s.n.*; W [W18890317836] • Muña; [9°40′ S, 75°49′ W]; *H. Ruiz & J.A. Pavón s.n.*; MA [MA813501], G-BOIS • ibid.; 1784, *H. Ruiz & J.A. Pavón s.n.*; US [US00115325] • Alrededores de Huánuco; [9°55′ S, 76°14′ W]; 2000 m a.s.l.; 12 Aug. 1965; *M. Fernández 5716*; HUT. – **Junín Region: Prov. Satipo** • Route from Comas to Satipo, km 164; 11°27′24″ S, 74°47′31″ W; 1656 m a.s.l.; 13 Feb. 2016; *P.W. Moonlight & A. Daza 237*; E [E00885560], MO [MO-3254806], MOL. – **Cultivated** • Grown in the Royal Botanic Garden Edinburgh from *P.W. Moonlight & A. Daza 217* RBGE Living Accession 20180174; 25 Jan. 2017; *P.W. Moonlight 1144*; E.

### Description

Caulescent herb, to 3 m high. *Stem* erect to scandent, branching; internodes to 10 cm long, to 8 mm thick, succulent, pale green, glabrous. *Stipules* deciduous, elliptic, 10–35 × 4–8 mm, apex truncate, opaque, pale green, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 0.8–5 cm long, pale green, glabrous; blade asymmetrical, transversely ovate, to 18 × 8 cm, succulent, apex short-acuminate to acuminate, base obliquely cordate, basal lobes not overlapping to overlapping, sinus to 18 mm deep, margin undulate to serrulate, aciliate or rarely ciliate towards the apex, upper surface dark green to purple, glabrous, lower surface pale green to purple, glabrous, veins pinnate, with 6–7 secondary veins on the larger side, 5–6 secondary veins on the smaller side. *Inflorescences* 1–3 per stem, bisexual, axillary, erect, cymose, with 5 branches, bearing up to 50 staminate flowers and up to 50 pistillate flowers, protandrous; peduncle to 10 cm long, pale green to red, glabrous, bracts deciduous, elliptic, 0.5–2.5 × 0.2–0.5 mm, translucent, white, glabrous, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 12 mm long, glabrous; tepals 2, spreading, ovate to broadly ovate, 1.5–6 × 2–8 mm, apex rounded, pink to white, glabrous, margin entire, aciliate; stamens 12–15, spreading, yellow, filaments < 0.2 mm long, free, anthers ellipsoid, 1.5–2 × 0.2 mm, dehiscing via lateral slits, connectives extended to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 12 mm long; bracteoles 2, positioned directly beneath the ovary, ovate, ca 1 × 1 mm, apex rounded, translucent, white or pink, glabrous, margin entire, aciliate; tepals 2, equal, deciduous in fruit, spreading, obovoid, 3–5 × 2–4 mm, apex rounded, white to pink, glabrous, margin entire, aciliate; ovary body ovoid, 2–3 × 1–2 mm, white to pink, glabrous, unequally 3-winged, the largest orbicular or rarely triangular 2–1 × 4–5 mm, the smallest marginal, to 1–3 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 1–4 mm long, irregularly multifid, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to

15 mm long. *Fruit body* ovoid, to 12 × 5 mm, drying brown, wings same shape as in ovary, the largest expanding to 12 × 10 mm.

**Proposed conservation assessment**

Previously assessed as Data Deficient (DD) by León & Monsalve (2006). Our concept of the species has an EOO of < 7000 km$^2$ and is known from four populations, although León & Monsalve (2006) cite specimens from a possible fifth population in Ayacucho Region. The populations in northern Huánuco and Junín Regions appeared stable in 2016 but both are next to recently improved roads and may come under pressure from land use change in the future. We have not visited the population in La Libertad, but the population in the south Huánuco survives only in isolated and diminishing patches of montane forest in a matrix of pasture and urban areas. We assess *B. glauca* as Vulnerable (VU B1ab(iii)).

**Synonymy notes**

Our circumscription of *B. glauca* includes three level synonyms: *B. glaucoides* Irmsch., *B. pseudoglauca* Irmsch., and *B.viridiflora* A.DC. These four species were last treated by Irmscher (1949), who described *B. glaucoides* and *B. pseudoglauca* in this work. Irmscher's circumscription was primarily based upon the size and shape of the largest ovary wing. His concepts of *B. viridiflora* and *B. glaucoides* both have semi-circular wings, with the former differing in its much larger (9–10 mm vs < 6 mm tall) wings. Similarly, his *B. glauca* and *B. pseudoglauca* both have rounded wings that are truncate at the top, with the latter having an ascending wing. In our concept of *B. glauca*, the wings expand in size from ovary to fruit and the shape varies slightly from semi-circular to triangular. These characters are not sufficient to separate species. Irmscher also separated *B. viridiflora* and *pseudoglauca* by the presence of "Cystospheres". We interpret these as the coloured patches on the young and shade leaves of all Peruvian members of *B.* sect. *Ruizopavonia*. As this varies within an individual, it is not a good species character. Indeed, it even varies within a single herbarium sheet viewed by Irmscher (*E.F. Poeppig 1057* held in W [W0021895]) but which he considered evidence that the collection was mixed. Accordingly, we synonymise *B. glaucoides*, *B. pseudoglauca*, and *B. viridiflora* with *B. glauca.*

In their account for the Flora of Peru, Smith & Schubert described *B. viridiflora* var. *parviflora* (Smith & Schubert 1941a: 202). This was separated from *B. viridiflora* var. *viridiflora* by its 4–5 mm long tepals on the pistillate flowers, and its 6–7 mm long capsule. Smith & Schubert did not describe the tepals of the pistillate flowers of the nominate variety and described its capsules as 12 mm long. The variation in both of these characters is well within our circumscription of *B. glauca* so we also synonymise Smith & Schubert's variety of *B. viridiflora* with *B. glauca*.

The name *B. glauca* has priority over all *B. viridiflora* because, while it was published later, its basionym was published first and is at the same rank. Klotzsch described *Pritzelia glauca* in the *Gattungen und Arten*, which is dated as 1854 but was not distributed until 1855 (Klotzsch 1855: 229).

**Typification notes**

The protologue of *Pritzelia glauca* cites collections made by Ruiz and Pavón in 1784 in Muña and labelled as "*Begonia glauca*" (Klotzsch 1855: 229). Uniquely for Klotzsch's *Begonia* names described from Ruiz and Pavón specimens, there is no specimen matching this description in Berlin herbarium. There are also no other matching specimens with Klotzsch's handwriting. The best match is a specimen in G-DC ex G-BOIS (F neg. 7341), which matches in date and locality. We designate this sheet as the lectotype of *P. glauca*.

The protologue of *B. viridiflora* cites *E.F. Poeppig 1063* collected in Cuchero in 1830 and no other collections (de Candolle 1859: 133). No herbaria are cited and the only sheet of this collection bearing A.P. de Candolle's handwriting is a single leaf in G-DC taken from W, demonstrating he saw the

specimens in W. We designate the only sheet bearing fruits in W as the lectotype (W18890111306) of *B. viridiflora*. This specimen lacks flowers, so it is also appropriate to designate a flowering specimen as an epitype. All flowering specimens of *B. glauca* known from Cuchero are type material of other names, so we designate *P.W. Moonlight & A. Daza 217* (MOL) from nearby Carpish as an epitype. Isoepitypes are deposited in E, G, and MO. Irmscher cites parts of three collections made by Eduard Friedrich Poeppig in Cuchero as type material of *B. pseudoglauca* (Irmscher 1949: 578). The first of these is an unnumbered collection made in August 1829. This specimen is cited as housed in W and was originally named by Poeppig as *B. subandina*, which is an unpublished name. We believe Klotzsch's citation refers to W0021881, which we designate the lectotype of *B. pseudoglauca*. This specimen only has leaves and a staminate inflorescence, thus it is again appropriate to designate an epitype. The second specimen is an unnumbered collection from 1830, which was identified by A.P. de Candolle as *B. denticulata* Kunth. This citation matches W0021880, which has an infructescence, thus we designate it an epitype of *B. pseudoglauca*. The final specimen is *E.F. Poeppig 1037* made in 1830 and identified by A.P. de Candolle as *B. denticulata*, which matches W0021895. In this case, Klotzsch states only the infructescence belongs to *B. pseudoglauca*. The infructescence mounted on this sheet remains a syntype of *B. pseudoglauca*.

The protologue of *B. glaucoides* (Irmscher 1949: 582) cites three collections as type material so it is appropriate to designate a lectotype. The first is *E.F. Poeppig 1057* collected in July 1829 and now held in W (W0021914). This specimen was identified by E.F. Poeppig as *B. praealla*, which is an unpublished name. A.P. de Candolle later identified it as "*B. glauca* Ruiz herb.". This specimen has a well-developed stem and infructescence, so we designate it as the lectotype of the species. The second collection is *E.F. Poeppig 1057* collected in 1830 and held in W (W0021895). As discussed under the typification of *B. pseudoglauca*, Irmscher treated this as a mixed collection. He only considered the stem and leaves mounted as material of *B. pseudoglauca*. A final collection was cited at "Herb. Breslau" and was also collected by Poeppig. Breslau herbarium was incorporated into WRSL in 1944. We have been unable to locate this syntype.

**Identification notes**

*Begonia glauca* is the only Peruvian *Begonia* with pinnate venation that is perpendicular to the orientation of the petiole. It may be confused with *B. peruviana* but also differs in its much larger stipules (10–35 × 4–8 mm vs 4–12 × 1–3 mm). It has also been confused with members of *B.* sect. *Cyathocnemis* but Peruvian members of this section either have much larger flowers or inflorescences with significantly fewer flowers.

**Distribution and ecology**

Endemic to Peru and known from La Libertad, Huánuco, and Junín Regions (Fig. 84A). León & Monsalve (2006) also reported its new synonym *B. viridiflora* var. *parviflora* L.B.Sm. & B.G.Schub. from Ayacucho Region based upon specimens at GH. Unfortunately, we have not visited GH and are unable to confirm their report. Found within lower and middle montane forest at an elevation of 1280–2050 m a.s.l. *Begonia glauca* is typically found at the edges of montane forests and at lower densities within patches of montane forest.

67. ***Begonia nunezii*** Moonlight sp. nov.
urn:lsid:ipni.org:names:77323296-1
Figs 84B, 86

**Diagnosis**

Most similar to *B. leptostyla* Irmsch. but differing in its densely hispid indumentum (vs sparsely to densely tomentose indumentum) with much longer hairs (ca 2 mm long vs 0.5 mm long); its larger stipules (10–12 × 4–6 mm vs 4–8 × 1–3 mm); its leaves, which are twice as long as broad (vs [2.5–]3–4 times as long as broad); and its bifid styles (vs bifid to irregularly multifid).

**Etymology**

We are delighted to name this species in honour of Percy Núñez, the Peruvian ethnobotanist who made all of the known collections of the species.

**Type**

PERU – **Cusco Region: Prov. La Convención** • Dist. Echarate, Segakiato in the Camisea River, lower Urubamba Region; 11°48′30″ S, 72°53′ W; 320 m a.s.l.; 2 Oct. 1997; *P. Núñez 20940*; holotype: USM; isotype: US [US00625236].

**Specimens examined**

PERU – **Madre de Dios Region: Prov. Manu** • Cocha Cashu; [11°45′ S, 71°58′ W]; 400 m a.s.l.; 4 Oct. 1985; *P. Núñez 1944*; US [US00222349]. – **Prov. Tambopata** • Tahuamanu, río Pariamanu; 12°23′35″ S, 69°21′36″ W; 200 m a.s.l.; 8 Aug. 1995; *P. Núñez 17306*; USM, WAG [2: WAG1576527, WAG1576528].

**Description**

Caulescent herb, to 1.5 m high. *Stem* erect, rarely branching; internodes to 9 cm long, to 5 mm thick, succulent, colour unknown, densely hispid. *Stipules* persistent, triangular, 10–12 × 4–6 mm, apex acute, translucent, colour unknown, sparsely hispid, margin entire, long-ciliate. *Leaves* 4–6, alternate, basifixed; petiole 1.8–8 cm long, colour unknown, densely hispid; blade asymmetric, ovate, to 14 × 7 cm, membranaceous, apex acuminate, base obliquely cordate, basal lobes not overlapping, sinus to 18 mm deep, margin irregularly serrate, ciliate, upper surface colour unknown, sparsely hispid, lower surface colour unknown, densely hispid on the veins, glabrous on the lamina, veins palmate-pinnate, ca 6 veined from the base, with 2–4 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3, axillary, erect, cymose, with 6 branches, bearing up to 16 staminate flowers and up to and 32 pistillate flowers, protandrous; peduncle to 11 cm long, colour unknown, densely hispid, bracts deciduous, lanceolate, 6–10 × 2–3 mm, translucent, colour unknown, glabrous, apex acute, margin entire, ciliate. *Staminate flowers*: pedicels to 10 mm long, densely hispid; tepals 2, spreading, broadly ovate, 5–9 × 5–8 mm, apex rounded, white, glabrous, margin entire, aciliate; stamens ca 25 projecting, yellow, filaments ca 1 mm long, free, anthers elliptic, c2.5 × 0.5 mm long, dehiscing via lateral slits, connectives extending to 0.1 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 30 mm long; bracteoles 2, directly beneath the ovary, obovate, 6–7 × 3–5 mm, apex obtuse, transparent, colour unknown, glabrous, margin entire, long-ciliate; tepals 5, subequal, deciduous in fruit, spreading, the largest ovate, 5–8 × 2.5–5 mm, apex rounded, white, glabrous, margin entire, aciliate, the smallest elliptic to ovate, 4–7 × 1.5–4 mm, apex rounded, white, glabrous, margin entire, aciliate; ovary body ovoid, 4–7 × 3–5 mm, colour unknown, glabrous, unequally 3-winged, wings triangular, largest 6–9 × 3–9 mm, smallest 5–9 × 2–6 mm; 3-locular, placentae unknown; styles 3, yellow, free, 1.5–5 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 25 mm long. *Fruit body*

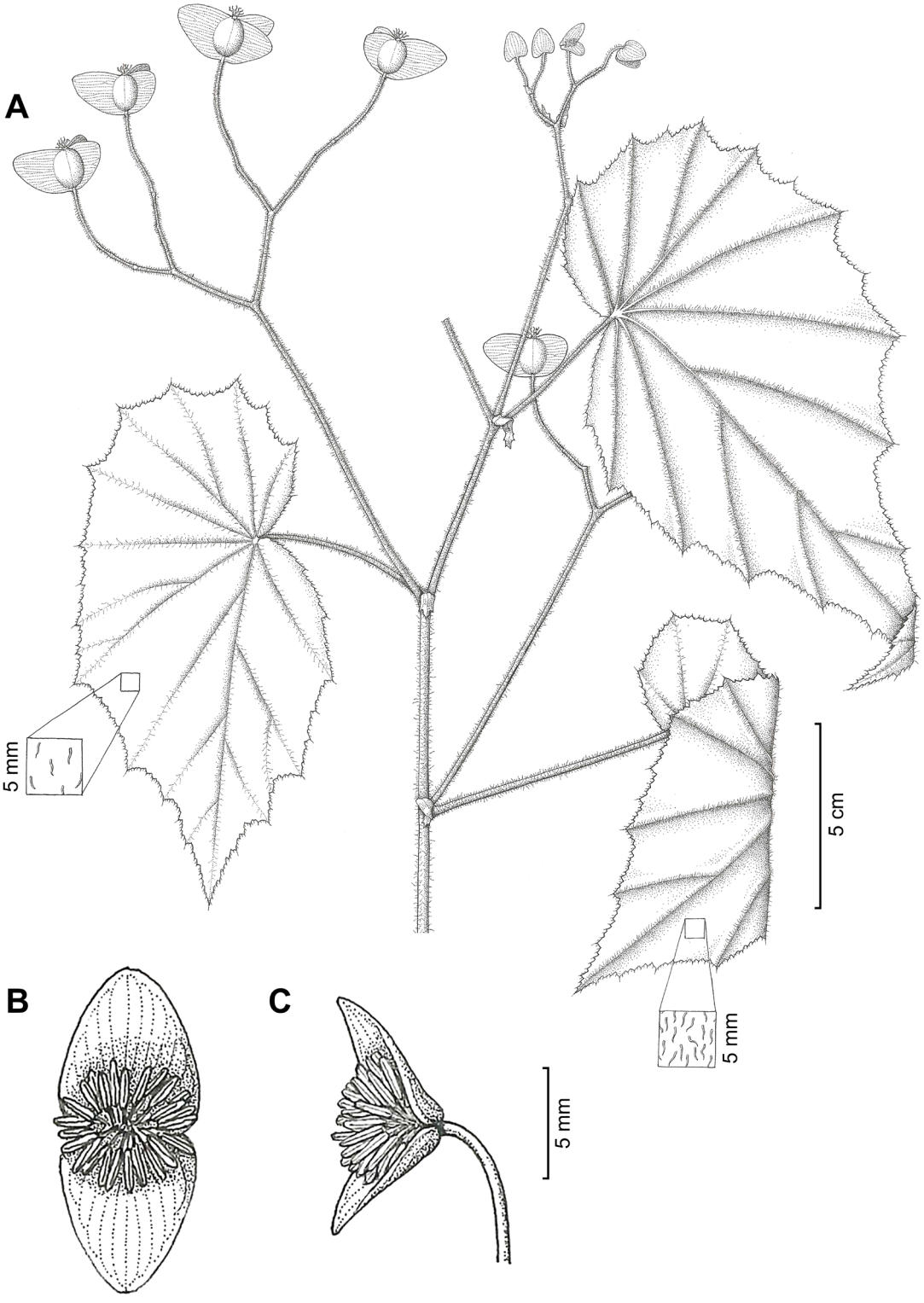


**Fig. 86.** *Begonia nunezii* Moonlight sp. nov. **A**. Habit, including insets of upper and lower leaf indumentum. **B**. Staminate flower, front view. **C**. Staminate flower, side view. Illustration by Anna Dorward from *P. Núñez 20940* (US).

ovoid, to 15 × 11 mm, drying light brown, wings same shape as in ovary, the largest expanding to 28 × 12 mm, the smallest expanding to 20 × 10 mm.

**Proposed conservation assessment**

Known from three populations 390 km apart in lowland Amazonia and last collected in 1997. The most southerly collection was made < 1 km from a small scale and presumably illegal gold mine, which satellite imaging shows was dug between 2004 and 2012 and expanded from 2017 to 2018. There is however ample riverside habitat remaining and a vast area of under-collected Amazonian forest both between and around all three populations. We assess *B. nunezii* sp. nov. as Data Deficient (DD).

**Notes**

*Begonia nunezii* sp. nov. is part of a group distinguished from other South American members of *B.* sect. *Ruizopavonia* by their densely tomentose or hirsute indumentum and persistent stipules. All Bolivian endemic members of the section are part of the group and *B. nunezii* sp. nov. is the first such species found outside of Bolivia. Several members also have multifid rather than bifid styles, though this can vary even within species. *Begonia nunezii* sp. nov. is unique within this group as the only species with transversely ovate leaves and palmate-pinnate venation. No members of the group have been included in any molecular phylogenies, so were tentatively placed in *B.* sect. *Ruizopavonia* by Moonlight *et al.* (2018). We also tentatively place *B. nunezii* sp. nov. in this section.

**Identification notes**

*Begonia nunezii* sp. nov. is most similar to Bolivian *B. leptostyla* (see Diagnosis) but could also be confused with the Bolivian species *B. bangii*. This species shares the densely long-hispid indumentum of *B. nunezii* sp. nov. but differs in its reniform to orbicular stipules. Like *B. leptostyla*, *B. bangii* also has leaves that are usually more than three times as long as broad. Within Peru, identifying *B. nunezii* sp. nov. is simple, as it is the only erect or climbing herb with a dense indumentum that is found in lowland Amazonia.

**Distribution and ecology**

Endemic to Peru and known from Madre de Dios and Cusco Regions (Fig. 84B). Found in Amazonian forest at an elevation of 200–320 m a.s.l. All collections of this species were made on the banks of small rivers, and we assume from its habit that it climbs through riverside vegetation. *Begonia nunezii* sp. nov. has been collected in flower in October and in fruit in August.

68. ***Begonia peruviana*** A.DC.
Fig. 84B

*Annales des Sciences Naturelles Botanique, Série 4* 11: 133 (de Candolle 1859). – **Type**: PERU – **Amazonas Region: Prov. Bongará** • Yambrasbamba; [5°44′ S, 77°54′ W]; *M. Matthews 1337*; lectotype: K [K000536743], **designated here**; isolectotype: OXF [OXF00058708].

de Candolle (1864: 332); Smith & Schubert (1941a: 196); Irmscher (1949: 602); Brako & Zarucchi (1993: 194); Vásquez *et al.* (2005: 112–125); León & Monsalve (2006: 168); Wasshausen *et al.* (2014: 386).

*Begonia juninensis* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 594 (Irmscher 1949). – **Type**: PERU – **[Pasco Region: Prov. Oxapampa]** • Pichis trail between San Nicolas and Azupizú; [10°41′ S, 74°55′ W]; 650–900 m a.s.l.; 6 Jul. 1929; *E.P. Killip & A.C. Smith 26097*; lectotype: US [US00955822], **designated here**; isolectotypes: F [V0361994F], NY [NY01085832] • ibid.; 6 Jul. 1929; *E.P. Killip & A.C. Smith 26108*; syntype: F [n.v.]; isosyntypes: US [US00967179], NY [NY3231024]. **Syn. nov.**

Brako & Zarucchi (1993: 193); León & Monsalve (2006: 166).

*Begonia rubiginosipes* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 596 (Irmscher 1949). – **Type**: PERU – **Junín Region: [Prov. Chanchamayo]** • Pichis trail, Eneñas; [10°45′ S, 75°13′ W]; 1600–1900 m a.s.l.; 30 Jun.–2 Jul. 1929; *E.P. Killip & A.C. Smith 25632*; lectotype: US [US00955809], **designated here**; isolectotypes: F [V0361996F], NY [NY01085482]. **Syn. nov.**

Brako & Zarucchi (1993: 195).

*Begonia prionophylla* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 597 (Irmscher 1949). – **Type**: PERU – **[Huánuco Region: Prov. Huánuco]** • Gebirge östl. Von Huallagam, über Muña; [9°40′ S, 75°49′ W]; 2500–2600 m a.s.l.; 1 Jul. 1913; *A. Weberbauer 6718*; lectotype: B [B100243071], **designated here**; isolectotypes: B [B100243072], F [photo K, P], MOL-WEB [3: MOL00002994, MOL00002995, MOL00002996]. **Syn. nov.**

Brako & Zarucchi (1993: 194); León & Monsalve (2006: 168).

*Begonia pilosella* Irmsch., *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 598 (Irmscher 1949). – **Type**: PERU – **Cusco Region** • San Miguel, Urubamba valley; [13°10′ S, 72°33′ W]; ca 1800 m a.s.l.; 7 June 1915; *J. Cook & M.E. Gilbert 1109*; lectotype: US [US01070200], **designated here** • Near río Yanamayo, below "Pillahuata"; [13°08′ S, 71°35′ W]; 2000–2300 m a.s.l.; 4–5 May 1925; *F.W. Pennell 14054*; syntypes: US [US00955816], F [V0361995F]; isosyntypes NY, PH [PH0007793]. **Syn. nov.**

Brako & Zarucchi (1993: 194); León & Monsalve (2006: 168).

*Begonia alnifolia* auct. non A.DC.: Brako & Zarucchi, *Monographs in Systematic Botany from the Missouri Botanical Garden* 45: 191 (Brako & Zarucchi 1993).

### Etymology

Alphonse Pyramus de Candolle named this species for the country of Peru.

### Selected specimens examined

PERU • *M. Matthews s.n.*; BM [BM000832012], G-BOIS • *M. Martínet 1579*; P [P05587362] • *M. Dombey s.n.*; P [P05587361]. – **Amazonas Region: Prov. Utcubamba** • "Nuevo Mundo" trail from Huarango (Cajamarca Region) to Pisaguas (Amazonas Region), ca 1 hr walk from crest at divide between regions; 5°15′36″ S, 78°39′54″ W; 1902 m a.s.l.; 28 Jan. 2016; *P.W. Moonlight & A. Daza 125*; E [E00885464], MOL. – **Prov. Bagua** • Comunidad Nativa Yamyakat, 5°03′33″ S, 78°20′19″ W; 380 m a.s.l.; Mar. 2001; *I. Salinas 739*; MO [MO-2229926] • Cordillera Colán; [5°39′ S, 78°15′ W]; 1800 m a.s.l.; 17 Oct. 1978; *P.J. Barbour 4148*; MO [MO-1835885]. – **Prov. Bongará** • Dist. Yambrasbamba, above Cpto. Buenos Aires, km (3)53.6 across río Chiriaco from Yambrasbamba, some 40 km N of Jumbilla; [5°41′ S, 77°54′ W]; 1850–2000 m a.s.l.; 2–26 Mar. 1967; *S.S. Tillett 673-374*; US [2: US00967188, US00967189] • Road from Amazonas to Rioja; 5°42′44″ S, 77°50′11″ W; 2157 m a.s.l.; 31 Jan. 2016; *P.W. Moonlight & A. Daza 142*; E [E00885484], G, MOL • Dist. Yambrasbamba, 10 km NE of Pomacochas; 5°46′ S, 77°55′ W; 1950 m a.s.l.; 25 May 2015; *M.C. Tebbitt & A. Daza 832*; MOL. – **Prov. Rodríguez de Mendoza** • Dist. Vista Alegre, entre Vista Alegre y río Salas; 6°10′ S, 77°19′ W; 1470–1525 m a.s.l.; 30 Jun. 1998; *I. Sánchez V., M. Dillon & N. Zapata 9562*; CPUN, F [*mixed collection*], US [US00673153] • Dist. Mariscal Benavides, Izcuchaca; 6°19′40″ S, 77°31′05″ W; 1880 m a.s.l.; *R. Vásquez & J. Campos 25289*; MOL, NY, US [US00672826], USM. – **Prov. Chachapoyas** • [5°44′ S, 77°54′ W]; *M. Matthews 149*; G [F neg. 24199] • Between viewpoint and Gocta Falls on the trail from Gocta village; 6°01′34″ S, 77°53′34″ W; 2210 m a.s.l.; *P.W. Moonlight 1243*; USM • Dist. Leymebamba, entre la Fila de la Culebra y El Tesoro (camino a Polamca); 6°42′13.98″ S, 77°37′25.92″ W; 2246–2337 m a.s.l.; 3 Sep. 2004; *V. Quipuscoa S., M. Vílchez T., N. Campos A. & P. Zafra R. 3233*; HUT. – **Cajamarca Region: Prov. San Ignacio** • San José de Lourdes, Camana; 5°01′00″ S, 78°54′00″ W; 1750–1900 m a.s.l.; 4 Mar. 1997; *J. Campos & S. Corales 3395*; MO [2: MO-1641368, MO-1641369], US [US00672831] • Dist.

Huarango, Nuevo Mundo, Caserío Gosén; 5°10′ S, 78°32′ W; 1590 m a.s.l.; 18 Jul. 1997; *E. Rodríguez R. 1706*; HUT [2], MO [MO-1641370], US [US00672828], USM • La Coipa, vista Florida-La Laguna, 5°26′00″ S, 78°56′30″ W; 2000–2100 m a.s.l.; 11 Jun. 1997; *J. Campos & Z. García 3967*; F, NY, US [US00672832], USM. – **Prov. Cutervo** • trail from Chorro Blanco to San Andres, Cutervo National Park; 6°10′ S, 78°45′ W; 2210–2240 m a.s.l.; 15 Sep. 1991; *A.H. Gentry, C. Díaz & R. Ortiz 74836*; MO [MO-098009], USM. – **San Martín Region: Prov. Rioja** • Pedro Ruíz-Moyobamba road, km 390, Venceremos; 5°50′ S, 77°45′ W; 1750 m a.s.l.; 29 Jul. 1983; *D.N. Smith 4446*; MO [MO-1641362], US [US00672827]. – **Ucayali Region: Prov. Padre Abad** • km 212, inmediacones de Sinchona cerca Divisoria; [9°09′ S, 75°47′ W]; 12 Aug. 1943; *C.A. Ridoutt 13113*; MO [MO-2264396], USM. – **Prov. Coronel Portillo** • Close to the Huánuco boundary, 42 km NE of Tingo María on route 15 from Pucallpa, cordillera Azul; [9°11′ S, 75°48′ W]; 1645 m a.s.l.; 25 Nov. 1975; *C. Davidson 3683*; MO [MO-1643536]. – **Huánuco Region: Prov. Leoncio Prado** • Cerca a la Divisoria; [9°10′ S, 75°47′ W]; 1500–1600 m a.s.l.; 25 Jun. 1976; *J. Schunke V. 9390*; MO [2: MO-2180491, MO-2180426], NY, US [US00967196] • Route from Tingo María to Divisoria; 9°11′55″ S, 75°49′30″ W; 1750 m a.s.l.; 7 Feb. 2016; *P.W. Moonlight & A. Daza 191*; E [E00885483], MO, MOL • Arroyo Bravo, about 40 km from Tingo María on highway to Pucallpa; [9°13′ S, 75°51′ W]; ca 1250 m a.s.l.; 1 Nov. 1949–5 Jan. 1950; *H.A. Allard 20390*; US [2: US00967177, US00967178]. – **Prov. Huánuco** • Dist. Chinchao, San Pedro de Carpish, a dos horas de la Hacienda Paty; 9°41′59″ S, 76°05′42″ W; 2300 m a.s.l.; 17 Aug. 2002; *I. Salinas & M. Chocce 484*; USM • Several km W of Carpish; [9°42′ S, 76°10′ W]; 2800 m a.s.l.; 8 Nov. 1938; *H.E. Stork & O.B. Horton 9888*; G, K • Sariapampa; [9°55′ S, 76°07′ W]; 3600 m a.s.l.; 14 May 1946; *F. Woytkowski 323*; USM. – **Pasco Region: Prov. Oxapampa** • Dist. Huancabamba, camino a Pozuzo; 10°04′02″ S, 75°32′59″ W; 1200–1480 m a.s.l.; 2 Jun. 2004; *R. Rojas, M. Huamán, A. Peña & J. Mateo 2527*; HOXA, MO [MO-1663770], US [US00900522] • Dist. Huancabamba, Límite Parque Nacional Yanachaga-Chemillén, Sector Grapanazu, 10°26′12″ S, 75°23′13″ W; 2210 m a.s.l.; 15 Oct. 2003; *R. Rojas, K. Meza, J. Lingan, E. Camavilca & M. Villaran 1766*; HOXA, MO [MO-1102966] • Bosque de Protección San Matias-San Carlos, Sector Unión-Shimakii; 10°45′04″ S, 74°55′47″ W; 1350–1420 m a.s.l.; 3 Jul. 2003; *A. Monteagudo & G. Ortiz 5673*; HOXA, K, MO [MO-1102968], US [US00843947]. – **Junín Region: Prov. Chanchamayo** • Pichis trail, Yapas [Yapaz]; [10°51′ S, 75°16′ W]; 1350–1600 m a.s.l.; 28–29 Jun. 1929; *E.P. Killip & A.C. Smith 25579*; NY, US [US00967182] • ca 1 km along path to NW of Puyu Sacha field station; 11°05′34″ S, 75°26′17″ W; 2222 m a.s.l.; 23 Jun. 2014; *P.W. Moonlight & A. Daza 39*; E [E00835506], MOL, USM • Tulumayo Valley, E slope, 5–10 km S of San Ramón, trail above La Esperanza to "Rincon"; 11°12′ S, 75′15″ W; 1000–1500 m a.s.l.; 5 Sep. 1982; *R.B. Foster 8521*; F, MO [MO-2180402], USM. – **Prov. Tarma** • Above La Merced at Cumbre Yacunay near summit; ca 2000 m a.s.l.; 15 Aug. 1957; *P.C. Hutchinson 1189*; G, K, NY, US [US00967191] • San Juan, cerca Huacapistana, margen izquierda río Tarma; [11°14′ S, 75°31′ W]; 2100–2200 m a.s.l.; 22 Sep. 1955; *R. Ferreyra 11280*; USM. – **Prov. Jauja** • road from Monobamba to Jauja; 11°23′35″ S, 75°19′32″ W; 1713 m a.s.l.; 17 Feb. 2016; *P.W. Moonlight & A. Daza 264*; E [E00885482], G, MOL • Road from Monobamba to Uchumayo; 11°29′14″ S, 75°16′24″ W; 2114 m a.s.l.; 13 Feb. 2016; *P.W. Moonlight & A. Daza 280*; E, MO, MOL. – **Prov. Satipo** • Route from Comas to Satipo, km 154; 11°30′24″ S, 74°49′16″ W; 2185 m a.s.l.; 13 Feb. 2016; *P.W. Moonlight & A. Daza 235*; E [E00885478], G, MOL. – **Madre de Dios Region: Prov. Manu** • Cerro de Pantíacolla, río Palotoa 10–15 km NNW of Shintuya, transect of ridgetop; 12°35′ S, 71°18′ W; 700–1300 m a.s.l.; 14 Dec. 1985; *R.B. Foster, R. Fernandez & E. Vivar 10833*; US [US00222169], USM. – **Cusco Region: Prov. La Convención** • Dist. Echarati, Llactahuamán, N del río Apurimac, NE de Pueblo Libre, S de la Cordillera de Vilcabamba; 12°51′55.5″ S, 73°30′40″ W; 1650 m a.s.l.; 14 Jul. 1998; *S. Baldeón M., W. Nauray, R. de la Colina & S. Uduvardy 3064*; US [US00625238] • Dist. Huayopata, Amaybamba, quebrada Quinsapuncoyoc; 12°59′ S, 72°30′ W; 1690 m a.s.l.; *G. Calatayud, E. Suclli & R. Bonino 1714*; MO [MO-840951], US [US00843951] • Dist. Santa Teresa, Yerbabuenayoc; 13°04′ S, 72°22′ W; 2420 m a.s.l.; *I. Huamantupa, N. Anaya, M. Callalli, J. Tito & L. Vargas 6622*; MO [MO-2153587], US [US00932226]. – **Prov. Paucartambo** • San Pedro Paucartambo; [13°03′ S, 71°33′ W]; 1200 m a.s.l.; *L.v.d. Hoogte & C. Roersch*

*3831*; NY • km 64 of road from Paucartambo to Pilcopata, 13°05′41″ S, 71°33′47″ W; 1912 m a.s.l.; 4 Aug. 2014; *P.W. Moonlight & A. Daza 82*; E [E00835917], MOL, USM. – **Prov. Quishpicanchi** • Dist. Camanti, Quincemil-Camanti, Tunquimayo River; 13.1471° S, 80.8208° W; 705 m a.s.l.; 7 Feb. 2011; *J.D. Wells, P. Centeno & M. Hammett 1248*; USM. – **Prov. Urubamba** • río Urubamba; 2050 m a.s.l.; [13°09′ S, 72°32′ W]; 7 Aug. 1952; *N. Angulo 1784*; HUT, US [US00967195] • Southwest slopes of Huayna Picchu; [13°10′ S, 72°33′ W]; 2700 m a.s.l.; 23 Jun. 1936; *J. West 6440*; MO [2: MO-1835944, MO-2180417] • Camino a Huiñayhuayna; [13°12′ S, 72°32′ W]; 2800 m a.s.l.; 7 May 1976; *R. Chávez A. 3431*; MO [MO-2183165].

### Description

Caulescent herb, to at least 3 m high. *Stem* erect to scandent, frequently branching; internodes to 11 cm long, to 4 mm thick, woody to succulent, green to red or brown, glabrous. *Stipules* early deciduous, lanceolate, 4–12 × 1–3 mm, apex acute, translucent, pale green to red, glabrous, margin entire, aciliate. *Leaves* > 10, alternate, basifixed; petiole 0.4–3 cm long, pale green to red, glabrous; blade subsymmetric, elliptical, to 13.5 × 6.5 cm, succulent, apex acuminate, base inequilateral, cuneate to rounded on the narrow side of the bade, rounded to truncate or cordate on the broad side of the blade, margin serrulate to double-serrate, ciliate, upper surface dull to rich green, often with red or purple spots on young leaves, glabrous, though young leaves often with a single hair at the centre of each colour spot, lower surface pale green to red or purple, glabrous, veins pinnate with 8–12 secondary veins on the larger side, 6–8 secondary veins on the smaller side. *Inflorescences* > 3, bisexual, axillary, erect, cymose, branching ca 8 times, bearing up to 128 staminate flowers and 56 pistillate flowers, protandrous; peduncle to 4 cm long, pale green to red, glabrous, bracts deciduous, elliptical, 2–4 × 0.5–1 mm, translucent, white to pink, glabrous, apex acute, margin entire to sometimes serrulate towards the apex, aciliate to ciliate at the apex. *Staminate flowers*: pedicels to 10 mm long, glabrous; tepals 2, spreading, circular, 2–5.5 × 2–6.5 mm, apex obtuse to rounded, base cordate to rounded, white to pink, glabrous, margin entire, aciliate; stamens 15–40, projecting, yellow, filaments 0.5–1 mm long, free, anthers elliptic, 0.5–0.8 × 0.2–0.3 mm long, dehiscing via lateral slits, connectives extending to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 8 mm long; bracteoles 2, directly beneath the ovary, lanceolate to ovate, 1–3 × 1–3 mm, apex acute, translucent, pink, glabrous, margin entire to lacerate at the apex, aciliate tepals 2, equal, deciduous in fruit, spreading, ovate to broadly ovate, 2.5–5 × 2–3.5 mm, apex rounded, white, glabrous, margin entire, aciliate; ovary body ovoid, 3–4 × 3–4 mm, white, glabrous, unequally 3-winged, the largest wing triangular, 4–6 × 6–1 mm, the smallest marginal, to 2 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2–4 mm long, once-divided, stigmatic papillae in a once- to twice-spirally twisted band. *Fruiting pedicel* to 25 mm long. *Fruit body* ovoid, to 12 × 7 mm, drying brown, wings same shape as in ovary, the largest expanding to 18 × 7 mm, the smallest to 4 mm wide.

### Proposed conservation assessment

Widespread and abundant throughout its range, where it has been collected in disturbed and secondary forest, as well as primary forest and several protected areas. We assess *B. peruviana* as Least Concern (LC), which also replaces the assessments of four new synonyms of *B. peruviana* as Data Deficient (DD) by León & Monsalve (2016).

### Synonymy notes

Irmscher split *B. peruviana* into five different species, describing *B. juninensis* Irmsch., *B. rubiginosipes* Irmsch., *B. pilosella* Irmsch., and *B. prionophylla* Irmsch. (Irmscher 1949). Irmscher never visited Peru or saw these plants in the wild and based his classification on duplicates of just fourteen collections in three herbaria (B, F, and US). He identified seven specimens as *B. peruviana* and each of his new species were represented by either one or two specimens. Irmscher was understandably unable to appreciate

the full range of variation of *B. peruviana* from this limited sample. Most of his new species were distinguished primarily by leaf shape. In common with other scrambling species, *B. peruviana* has a highly variable leaf shape. Our extensive field, herbarium, and glasshouse experience of this species have demonstrated that leaves in the same population or even on the same plant differ in shape, colour, and pubescence from the top to the bottom of the plant, or from sun to shade. There is a tendency for certain leaf shapes in parts of the species' range (e.g., specimens from further south tend to have shorter, wider leaves) but we do not consider this variation sufficient to merit taxonomic recognition. Accordingly, we synonymise all of Irmscher's segregate species with *B. peruviana*. The specific characters that Irmscher (1949) used to distinguish each of his species are discussed below.

It is unclear what character Irmscher used to separate *B. juninensis* from the four other Peruvian members of *B.* sect. *Ruizopavonia* he recognised. His notes emphasise that the pistillate flowers have two tepals (Irmscher 1949: 594), but this is true of every Peruvian member of the section. Irmscher believed *B. juninensis* to be most closely-related to *B. alnifolia* A.DC. but this seems primarily based upon the relatively large leaves of the type collection. A duplicate of the type collection at NY was not seen by Irmscher and has much smaller leaves. It seems likely that the material Irmscher saw was collected from the shade whereas the NY duplicate was collected in the sun.

*Begonia rubiginosipes* was separated from *B. peruviana* based upon several characters (Irmscher 1949: 596). Its rounded leaf base and broader leaves reminded Irmscher of *B. alnifolia*. These characters are similar to those he used to separate *B. pilosella* (see below) but unlike this species the leaves of the type specimens of *B. rubiginosipes* do not have scattered bristle-like hairs. Irmscher also noted the twice-twisted styles on the type specimen and the toothed bracteoles of the pistillate flower. The leaves of *B. peruviana* are extremely variable, thus we do not consider leaf base shape, breath, or the presence of hairs good characters to separate *B. rubiginosipes*. Furthermore, the bracteoles of *B. peruviana* vary from linear to rounded with varying levels of serration and the styles vary from once to twice twisted. *Begonia rubiginosipes* falls within the natural variation of *B. peruviana*, thus we synonymise this species.

In the protologue of *B. prionophylla*, the author separated the species from *B. peruviana* based upon its doubly serrated leaves and tendency towards single stomata, rather than stomata in groups of two to four (Irmscher 1949: 597). The level of leaf serration is highly variable in our concept of *B. peruviana* and we cannot find any other characters that correlate with it. Furthermore, we do not consider stomatal clustering a good character for separating species. Accordingly, we synonymise *B. prionophylla* with *B. peruviana*.

Irmscher distinguished *B. pilosella* from *B. peruviana* based upon its relatively broad outer leaf lobes with a rounded base (Irmscher 1949: 598). He further noted scattered bristles on the upper leaf surface of *B. pilosella*, which he considered absent in *B. peruviana*. In Irmscher's opinion, these characteristics were sufficient to distinguish two species, but only when middle-aged leaves were considered. Younger leaves of Irmscher's *B. pilosella* were described the same as leaves of *B. peruviana*. In our extensive field experience of this species, the width of leaves, the shape of the leaf base, and the presence and density of bristles on the leaf surface differs considerably within populations of all Peruvian species of *B.* sect. *Ruizopavonia*. In many cases, these characters differ between young and old, or sun and shade leaves on the same plant. We do not consider them sufficient to separate species.

**Typification notes**

A.P. de Candolle cited material collected by H.A. Pavón and M. Matthews in the protologue of *B. peruviana* (de Candolle 1859: 133). In his later revision of the Begoniaceae (de Candolle 1864: 332), he cited *H.A. Pavón s.n.* in G-BOIS and *M. Matthews 1337* in K, which presumably refer to the same specimens as the protologue. We have been unable to locate any collections of *B. peruviana* made by

Pavón, although an illustration made on their expedition appears to show this species and suggests they did collect it (MA-AJB04-D-1393). We therefore designate *M. Matthews 1337* at K (K000536743) as the lectotype of *B. peruviana*. The lectotype has a determination slip by A.P. de Candolle, confirming he considered this to be a specimen of *B. peruviana*. A duplicate of this specimen is found in OXF and we consider this an isolectotype. Other specimens of *B. peruviana* collected by Matthews are found in BM, G, G-BOIS. There is no indication A.P. de Candolle saw these specimens, so we do not treat them as syntypes.

The protologue of *B. juninensis* cites material of *E.P. Killip & A.C. Smith 26097* (F, US) and *26108* (F; Irmscher 1949: 594). Of these three sheets, only *E.P. Killip & A.C. Smith 26097* (US [US00955822]) has both flowers and fruits so we designate this the lectotype of *B. juninensis*. Irmscher (1949: 594) cited duplicates of *E.P. Killip & A.C. Smith 25632* in F and US in the protologue of *B. rubiginosipes*. The specimen in US is by far the superior specimen and we designate it as the lectotype of *B. rubiginosipes.*

E. Irmscher cited duplicates of *A. Weberbauer 6718* in B and F as type material of *B. prionophylla* (Irmscher 1949: 597), so it is appropriate to designate a lectotype from this material. We have only seen photographs of the material at F so designate a sheet at B (B100243071) as the lectotype. This is one of two equally good sheets of this collection at B but has superior label information.

Two collections are cited in the protologue of *B. pilosella*, *F.W. Pennell 14054* and *Cook & Gilbert 1109* (Irmscher 1949: 598). We designate a sheet of the latter held in US as the lectotype of this name, as it is the most complete specimen of the syntypes.

**Identification notes**

*Begonia peruviana* is by far the most common and widespread species of large (> 50 cm high) *Begonia* with pinnately veined leaves and an upright to trailing habit in Peru. Care should be taken to ensure potential candidate collections do not have 3-veins from the base (*B. rossmanniae* or *B. glabra*); any types of hairs on the stem (various species); or inflorescences that branch fewer than six times (*B. yuracyacuensis* Moonlight sp. nov.).

**Distribution and ecology**

Known from Peru and Bolivia. Within Peru, collected in Amazonas, Cajamarca, San Martín, Ucayali, Huánuco, Pasco, Junín, Madre de Dios, and Cusco Regions (Fig. 84B). Found at an elevation of 380–3600 m a.s.l., chiefly in lower, middle, and upper montane forest and less commonly in northwest Peruvian montane forest. *B. peruviana* is locally common in disturbed, montane forest and at the edges of montane forest patches and is less commonly found within intact patches. It grows as a terrestrial or rarely epiphytic, semi-scandent herb, reaching at least 4 m in length.

69. ***Begonia yuracyacuensis*** Moonlight sp. nov.
urn:lsid:ipni.org:names:77323297-1
Figs 6C, 84A, 87

**Diagnosis**

Most similar to *B. peruviana* but differing in its inflorescences that branch up to 4 times (vs 6 to 8 times); its subequal, obdeltoid fruit wings with straight sides (vs unequal wings, the largest obdeltoid with rounded sides, the smallest ridgelike); its broadly ovate bracts and bracteoles (vs elliptic bracts and linear to ovate bracteoles); its larger staminate tepals (10–14 × 10–15 mm vs 2–5.5 × 2–6.5 mm); and its styles, which are thickened at the bifurcation (vs not thickened).

### Etymology

The name refers to the río Yuracyacu, which flows through the Boquerón de Padre Abad. This means the 'white river' in Quechua.

### Type

PERU – **San Martín Region: Prov. Coronel Portillo** • Vicinity of Aguaytía, Boquerón de Padre Abad; [9°04′ S, 75°41′ W]; [300 m a.s.l.]; 1 Aug. 1962; *M.E. Mathias & D. Taylor 6096*; holotype: USM; isotype: MO [MO-1641350].

### Specimens examined

PERU – **San Martín Region: Prov. Rioja** • Dist. Nuevo Cajamarca, cerca del Poblado Palestina, camino a la Cueva Palestina; 5°54′ S, 77°21′ W; 890 m a.s.l.; 1 Nov. 1996; *I. Sánchez Vega & M.O. Dillon 8389*; CPUN, F [V0086778F], US [US00673143]. – **Ucayali Region: Prov. Coronel Portillo** • Dist. Padre Abad, Boquerón de Padre Abad; 9°04′ S, 75°41′ W]; 300 m a.s.l.; 8 Aug. 1946; *G. Woytkowski 34341*; G [2: 1 mixed sheet], MO [MO-1641413, mixed sheet] • ibid.; 500 m a.s.l.; 10 Sep. 1980; *P.J.M. Maas, L. Cobb & E.H.M. Grothe 4574*; U, US [US00967205], USM • ibid.; 17 Aug. 1946; *R. Ferreyra 1147*; MO [MO-2264390], US [US00967391], USM • ibid.; 500–550 m a.s.l.; 2 Oct. 1950; *R. Ferreyra 8110*; MO [MO-2264395], MOL, US [US00967204], USM [2] • ibid.; 9°04′01″ S, 75°40′46″ W; 403 m a.s.l.; 8 Feb. 2016; *P.W. Moonlight & A. Daza 199*; E [E00885477], MO, MOL • ibid.; 470 m a.s.l.; 8 Aug. 1946; *F. Woytkowski 341*; USM • Dist. Iparía, Cuenca del río Iparía, afluente del río Ucayali, reserva Comunal el Sira; 9°26′14″ S, 74°33′30″ W; 400–450 m a.s.l.; 5 Oct. 2007; *J.G. Graham 4898*; MOL, US [US01008606]. – **Cultivated** • Grown in the Royal Botanic Garden Edinburgh from *P.W. Moonlight & A. Daza 199* RBGE Living Accession 20160139; 22 Mar. 2021; *P.W. Moonlight 1952*; E.

### Description

Caulescent herb, to at least 1 m high. *Stem* erect, frequently branching; internodes to 5 cm long, to 6 mm thick, succulent, green to red at the nodes, glabrous. *Stipules* early deciduous, lanceolate, 8–14 × 2–4 mm, apex acuminate, translucent, pale green, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 0.5–1.7 cm long, pale green to red, glabrous; blade subsymmetric, oblong, to 12 × 6.5 cm, succulent, apex short acuminate, base inequilateral, cuneate to rounded on the narrow side of the bade, rounded on the broad side of the blade, margin serrulate, ciliate, upper surface dark green, often with red or purple spots on young leaves, glabrous, though young leaves often with a single hair at the centre of each coloured spot, lower surface pale green, glabrous, veins pinnate with 9–12 secondary veins on the larger side, 8–12 secondary veins on the smaller side. *Inflorescences* > 3, bisexual, axillary, erect, cymose, branching up to 4 times, bearing up to 8 staminate flowers and 8 pistillate flowers, protandrous; peduncle to 2.8 cm long, pale green, glabrous, bracts deciduous, ovate, ca 4 × 3 mm, translucent, white to pink, glabrous, apex acute, margin serrulate towards the apex, ciliate. *Staminate flowers*: pedicels to 13 mm long, glabrous; tepals 2, spreading, broadly ovate, 10–14 × 10–15 mm, apex rounded, white, glabrous, margin entire, aciliate; stamens ca 35, projecting, yellow, filaments 0.2 mm long, free, anthers elliptic, 1–1.5 × 0.8 mm long, dehiscing via lateral slits, connectives extending to 0.5 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 13 mm long; bracteoles 2, directly beneath the ovary, broadly ovate, 5–7 × 4–6 mm, apex rounded, translucent, white flushed pink, glabrous, margin serrulate at the apex, ciliate, tepals 2, equal, deciduous in fruit, spreading, ovate, 8–11 × 8–12 mm, apex rounded, white, glabrous, margin entire, aciliate; ovary body ovoid, 8–9 × 4–6 mm, white, glabrous, sub-equally 3-winged, the largest wing obdeltoid, 8–12 × 10–13 mm, the smallest obdeltoid, to 12 × 8 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 4 mm long, once-divided, thickened above the division, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 18 mm long. *Fruit body* ovoid, to 12 × 7 mm, drying brown, wings same shape as in ovary, the largest expanding to 16 × 13 mm, the smallest to 14 × 16 mm.

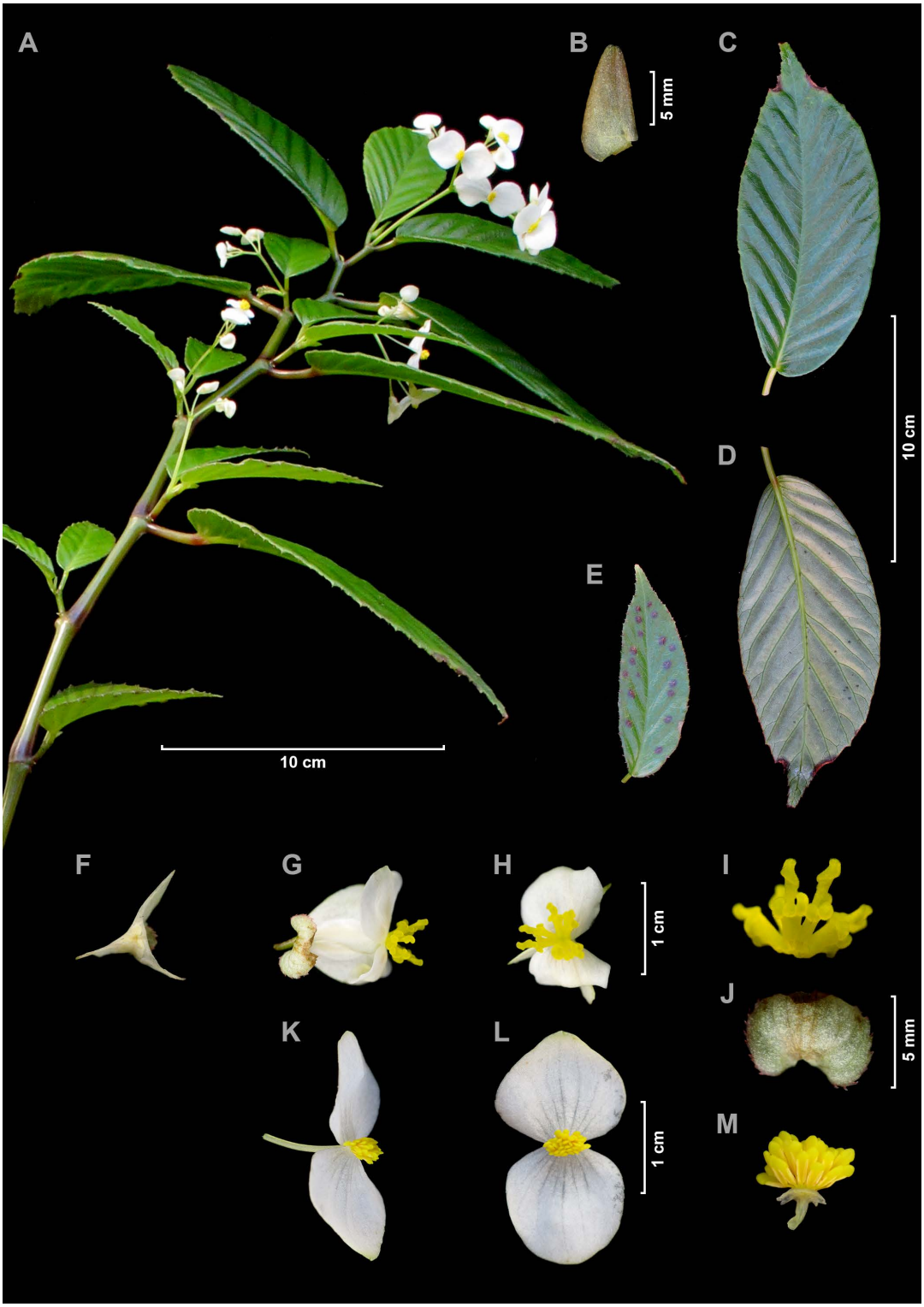


**Fig. 87.** *Begonia yuracyacuensis* Moonlight sp. nov. **A**. Habit. **B**. Stipule. **C**. Leaf, adaxial surface. **D**. Leaf, abaxial surface. **E**. Shade leaf, adaxial surface. **F**. Cross section of ovary. **G**. Pistillate flower, side view. **H**. Pistillate flower, front view. **I**. Pistils, side view. **J**. Bracteole. **K**. Staminate flower, side view. **L**. Staminate flower, front view. M. Androecium, side view. Photographs taken by D.A. Purvis and P.W. Moonlight in the living collections of the Royal Botanic Garden Edinburgh (Accession 20160139, grown from seeds collected as part of *P.W. Moonlight & A. Daza 199*).

**Proposed conservation assessment**

Known from localities approximately 125 km apart in Ucayali Region Peru and a third locality in San Martín Region. These three localities are low lying, extremely humid hills. Similar localities elsewhere are poorly explored in Peru, so it is likely found elsewhere. However, because it is only known from three localities, we assess *B. yuracyacuensis* sp. nov. as Vulnerable (VU D2), owing to the proximity of two of its collections to major roads and the widescale deforestation in lowland montane forests in Amazonian Peru.

**Notes**

The label of the type collection states it was collected in San Martín Region. The locality description refers however to the Boquerón de Padre Abad, which is in Ucayali Region.

**Identification notes**

When in flower and fruit, it is trivial to distinguish the new species from *B. peruviana* based upon its fewer-branched inflorescences (up to 4 times branching vs up to 8 times branching) and much larger staminate and pistillate flowers (see Diagnosis). The two species are very difficult to distinguish when sterile. The stipules of the new species tend to be broader (2–4 mm wide vs 1–3 mm wide) and the leaf margins of both species can be serrulate but *B. peruviana* more frequently has serrate or doubly-serrate margins. Finally, the two species differ in their habits. *B. peruviana* tends to scramble through other plants and reaches up to at least 3 m in height. In contrast, *B. yuracyacuensis* sp. nov. grows horizontally from vertical cliffs and is self-supporting.

**Distribution and ecology**

Endemic to Peru and known from San Martín and Ucayali Regions (Fig. 84A). Known from an elevation of 300–890 m a.s.l. and collected by the authors within the Boquerón de Padre Abad, a ca 700 m a.s.l. deep gorge in Amazonian Peru, where the río Yuracyacu cuts through a north-south ridge to the west of the Cordillera Azul. This is the most easterly ridge of the Andes in central Peru and therefore one of the wettest locations in Peru. The new species is found growing under and around waterfalls on the walls of the gorge. It has been collected growing in association with *B. albomaculata*, which is a distantly related species.

***Begonia*** sect. ***Wageneria*** (Klotzsch) A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 137 (de Candolle 1859). – *Wageneria* Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 126 (Klotzsch 1854). – **Type**: holotype: *Wageneria fagifolia* (Fisch. ex Otto & A.Dietr.) Klotzsch ≡ *Begonia fagifolia* Fisch. ex Otto & A.Dietr.

**Synonymy notes**

For a full list of sectional synonyms, see Moonlight *et al.* (2018).

**Notes**

This section consists of scandent species found mostly in the Atlantic Forests of Brazil with the notable exception of *B. glabra*, which is found as far north as Mexico and across Amazonia, including in Peru. It is superficially similar to *B.* sect. *Rossmannia* but can be distinguished by its axillary, cymose inflorescences rather than terminal, thyrsoid inflorescences.

70. ***Begonia glabra*** Aubl.
Figs 88, 89

*Histoire des Plantes de la Guiane Françoise* 2: 916 (Aublet 1775). – *Wageneria glabra* (Aubl.) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 126 (Klotzsch 1854). – **Type**: FRENCH GUIANA • Cayenne Arrondissement. Entre la riviere de Sinémari & la crique de Galibis; [5°08′ N, 52°38′ W]; *J.B.C.F. Aublet s.n.*; lectotype: BM [BM001008462], designated by Smith & Wasshausen (1979: 239).

Klotzsch (1855: 235); Walpers (1858: 926); Schulz (1911: 6); Standley (1937: 741); Smith & Schubert (1941a: 190, 1944: 82, 1952: 38, 1958: 54); Smith (1973: 216); Smith & Wasshausen (1979: 239, 1986: 14, 1989: 39); Brako & Zarucchi (1993: 192); Vásquez *et al.* (2005: 112–125); Wasshausen *et al.* (2014: 384); Burt-Utley (2015: 47).

*Begonia scandens* Sw. (nom. illeg.; nom superfl.), *Nova Genera & Species Plantarum*: 86 (Swartz 1788). – **Type**: FRENCH GUIANA • Cayenne Arrondissement: entre la rivière de Sinémari & la crique de Galibis; 5°08′ N, 52°38′ W]; *J.B.C.F. Aublet s.n.*; holotype: BM [BM001008462].

von Steudel (1840: 194); de Candolle (1864: 362); Schulz (1911: 5).

*Begonia elliptica* Kunth in Humboldt *et al.* (1825), *Nova Genera et Species Plantarum (quarto ed.), vol. 7*: 138 (Humboldt *et al.* 1825). – **Type**: PERU – **[Cajamarca Region: Prov. Jaén]** • Prope Jaen de Bracamoros (Alto Marañón); [5°40′ S, 78°40′ W]; 300 m a.s.l.; Aug, *F.W.H.A. von Humboldt & A.J.A. Bonpland s.n.*; lectotype: P [P00679512], **designated here**; isolectotype: P [P00679513].

de Candolle (1864: 362); Schulz (1911: 5).

*Begonia moritziana* Kunth & Bouché, *Index Seminum in Horti Botanici Berolinensis. Berlin (Berolinensis)* 1848: 16 (Kunth & Bouché 1848). – **Type**: VENEZUELA • Caracas *J.W.K. Moritz s.n.*; [n.v., herbarium unknown].

de Candolle (1864: 362).

*Begonia lucida* Otto & A.Dietr. (nom. illeg.; later homonym non Haw.), *Allgemeine Gartenzeitung* 16 (21): 162 (Otto & Dietrich 1848). – *Wageneria lucida* (E.Otto & A.Dietr) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 126 (Klotzsch 1854). – **Type**: unknown.

Klotzsch (1855: 234); Walpers (1858: 926); de Candolle (1864: 362); Schulz (1911: 5).

*Begonia physalifolia* Liebm., *Videnskabelige Meddelelser fra den Naturhistoriske Forening i Kjöbenhavn* 1852: 19 (Liebmann 1852). – **Type**: COSTA RICA • "in monte Naranjo"; 1524 m a.s.l.; May 1847; *C. Ørsted 196*; lectotype: C [C10008256], **designated here**.

de Candolle (1864: 362); Schulz (1911: 5).

*Wageneria deflexa* Klotzsch, *Gattungen und Arten* 1854: 233 (Klotzsch 1855). – **Type**: VENEZUELA • *H. Wagener 2543*; holotype: B [n.v.].

Walpers (1858: 925); Schulz (1911: 6).

*Wageneria montana* Klotzsch, *Gattungen und Arten* 1854: 235 (Klotzsch 1855). – **Type**: PERU – **[Huánuco Region: Prov. Huánuco]** • Muña; [9°40′ S, 75°49′ W]; 1785, *H. Ruiz & J.A. Pavón s.n.*; [n.v., herbarium unknown].

Walpers (1858: 926); Schulz (1911: 6).

*Begonia locellata* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 137 (de Candolle 1859). – **Type**: MEXICO – **[Oaxaca State]** • Sierra San Pedro Nolasco, Talea; [17°18′ N, 96°25′ W]; 1843–1844; *C. Jurgensen 958*; lectotype: K [K000536562], **designated here**; isolectotypes: BM, G.

Smith & Schubert (1958: 54).

*Begonia scandens* var. *amplifolia* A.DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 362 (de Candolle 1864). – *Begonia glabra* var. *amplifolia* (A.DC.) L.B.Sm. & B.G.Schub., *Publications of the Field Museum of Natural History, Botanical Series* 13 (4/1): 191 (Smith & Schubert 1941a). – **Type**: PERU – **[Huánuco Region: Prov: Huánuco]** • Pampayaco; [9°33′ S, 75°54′ W]; *E.F.*

*Poeppig 1063*; syntype: G-BOIS [n.v.] • ibid.; *E.F. Poeppig 1928*; syntype: G-BOIS [n.v.]. – **[Prov: Tocache: Dist. Tocache]** • Tocache; [8°12′ S, 76°30′ W]; *E.F. Poeppig 1928*; syntype: W [n.v.].

Brako & Zarucchi (1993: 192).

*Begonia hoegeana* Regel & Schmidt, *Gartenflora* 35: 398 (von Regel & Schmidt 1886). – **Type**: GUATEMALA – **Jalapa Department** • *C.T. Hoege s.n.*; [n.v., herbarium unknown].

Smith & Wasshausen (1979: 467).

*Begonia repens* Sessé & Moç. (nom. illeg.; later homonym non Lam.), *Flora Mexicana, 2nd Edition*: 219 (Sessé & Moçino 1894). – **Type**: MEXICO • *M. Sessé & J.M. Mociño 4512*; lectotype: MA [MA603076], **designated here**.

Smith & Schubert (1945: 27).

*Begonia scandens* var. *cordifolia* C.DC., *Bulletin de L'Herbier Boissier II* 320 (de Candolle 1908). – *Begonia glabra* var. *cordifolia* (C.DC.) Irmsch., *Pareys Blumengartnerei, 2nd Edition*: 72 (Irmscher 1960). – **Type**: NICARAGUA – **Grenada Dept.** • Volcan Mombacho; [11°50′ N, 85°58′ W]; 10 Feb. 1903; *C.F. Baker 2336*; holotype: G; isotypes: K [2], MICH [MICH11115797], MO [MO-024982], US [US00115448].

de Candolle (1864: 362); Burt-Utley (2015: 47).

*Begonia glabra* var. *coralipetiolis* Anon., *Begonian* 13: 153 (Anonymous 1946). – **Type**: unknown. **Syn. nov.**

*Begonia populifolia* Schott (nom. inval.; nom. rej. pro syn. *Begonia scandens* Sw. (nom. illeg.; nom. superfl.)), *Systema Vegetabilium, 16th Edition* 4 (appendix): 408 (Schott 1827).

Von Steudel (1840: 194); Schulz (1911: 5).

*Wageneria deflexa* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 126 (Klotzsch 1854).

*Wageneria montana* Klotzsch (nom. inval.; nom. nud.), *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 126 (Klotzsch 1854).

*Pritzelia deflexa* A.DC. (nom. inval.; nom. rej. pro syn. *Begonia scandens* Sw. (nom. illeg.; nom. superfl.)), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 362 (de Candolle 1864).

Schulz (1911: 6); Golding & Wasshausen (2002: 185) [as 'deflecta'].

*Pritzelia glabra* A.DC. (nom. inval.; nom. rej. pro syn. *Begonia scandens* Sw. (nom. illeg.; nom. superfl.)), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 362 (de Candolle 1864).

Schulz (1911: 6).

*Pritzelia lucida* A.DC. (nom. inval.; nom. rej. pro syn. *Begonia scandens* Sw. (nom. illeg.; nom. superfl.)), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 362 (de Candolle 1864).

Schulz (1911: 6).

*Pritzelia montana* A.DC. (nom. inval.; nom. rej. pro syn. *Begonia scandens* Sw. (nom. illeg.; nom. superfl.)), *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 362 (de Candolle 1864).

Schulz (1911: 6).

*Begonia glabra* var. *physalifolia* Liebm. ex Buxton (nom. inval.; nom. nud.), *Check List of Begonias*: 78 (Buxton 1957).

### Etymology

Named for the species' lack of indumentum, although some individuals outside Peru do have an indumentum.

### Specimens examined

PERU • 1778–1788; *H.A. Ruiz & J.A. Pavón s.n.*; MA [MA813504, mixed collection], OXF. – **Loreto Region: Prov. Loreto** • Carretera Oleoducto secundario entre los campamentos Bartra 1 y Bartra 4;

2°30′ S, 75°45′ W; ca 200 m a.s.l.; 15 Sep. 1979; *C. Díaz & N. Jaramillo 1444*; MO [MO-1642665], US [US00222080] • Valseca-Rudolpho, río Corrientes between Q. Platanoyacu and mouth of río Mucusari; [2°59′ S, 75°48′ W]; 18 Sep. 1961; *S. McDaniel & M. Marcos 11071*; NY, USM • Pampa Hermosa and vicinity, río Corrientes, 1 km S of jct. with río Macusari; 3°15′ S, 75°50′ W; 150 m a.s.l.; 4–9 Jun. 1986; *W.H. Lewis, M. Elvin-Lewis, M.C. Gnerre & C. Díaz 10687*; MO [MO-2340415], USM. – **Prov. Maynas** • Negro Urco, río Napo; 3°00′ S, 73°25′ W; ca 125 m a.s.l.; 13 Jul. 1971; *S. McDaniel 15345*; USM • San Antonio, en río Italaya; [3°44′ S, 73°14′ W]; ca 110 m a.s.l.; 18 Sep. 1929; *E.P. Killip & A.C. Smith 29368*; NY, US [US00222107] • Dist. Iquitos, Estación Experimental IIAP, Alpahuayo, 21 km al S de Iquitos; 4°10′ S, 73’30′ W; 180 m a.s.l.; *J.J. Pipoly, R. Vásquez, N. Jaramillo & R. Ortíz 12154*; MO [MO-1642602], USM. – **Prov. Datem del Marañón** • NW slopes of Cerros Campanquiz, río Marañón just above Pongo de Manseriche; [4°27′ S, 77°35′ W]; 250–350 m a.s.l.; 17 Oct. 1962; *J.J. Wurdack* 2290 (NY, US [US00222099], USM. – **Prov. Alto Amazonas** • Puranchim, río Sinchiyacu; 2°50′ S, 76°55′ W; 200 m a.s.l.; 21–27 Nov. 1986; *W.H. Lewis, M. Elvin-Lewis, J. Campos & D. Fast 12105*; MO [MO-2340414] • Puerto Limón; [4°42′ S, 72°13′ W]; *G. Tessmann 3854*; NY • Yurimaguas; [5°54′ S, 76°06′ W]; Aug. 1902, *E. Ule 6268*; K, L. – **Prov. Ucayali** • Contamana, trail to Aguas Calientes; [7°15′ S, 74°59′ W]; 160–200 m a.s.l.; 27 Jul. 1970; *S. McDaniel 14085*; MO [MO-1642634], USM • ibid.; 27 Jul. 1970; *F. McDaniel & L. Santiago 2558*; US [US00222092]. – **Amazonas Region: Prov. Condorcanqui** • Quebrada Satik entsa; 600 m a.s.l.; 16 Jul. 1974; *R. Kayap 1130*; MO [MO-286136], NY, USM • Cerros Kampanis, serranía entre los ríos Santa Morena, desde río Marañón hasta frontera con Ecuador; 3°49′19.28″S, 77°36′36.02″ W; 1044 m a.s.l.; *I. Huamantupa, D. Neill, N. Pitman, C. Kakekai & J. Ramírez 15831*; F [V0386830F], USM • río Cenepa, 7 km E of Huampami; [4°27′ S, 78°10′ W]; 305 m a.s.l.; 10 Oct. 1972; *B. Berlin 213*; MO [MO-286132] • Bajo Cachiaco, Tayuntsa, Quebrada Kagtashentsa, río Nieva; [5°05′ S, 77°59′ W]; 14 Aug. 1997; *J. Albán, B. Millán, N. Malca & R. Apanú 9948*; MO [MO-2991016]. – **Prov. Bagua** • Dist. Imaza, comunidad Aguaruna de Kusú-Listra, Cerro Apág; [4°45′ S, 78°20′ W]; 600–700 m a.s.l.; 16 Sep. 1996; *C. Díaz, A. Peña & D. Shuwin 8179*; MO [MO-286134], MOL, USM • Dist. Imaza, comunidad Aguaruna de Putuim; 4°55′ S, 78°19′ W; 480 m a.s.l.; *E. Rodríguez R., P. Atamain, E. Chavez-Agkuash & W. Atamain 1144*; HUT, MO [MO-286139], USM • Dist. Aramango, Cerros de Nueva Esperanza; 5°28′02″ S, 78°23′11″ W; 1800 m a.s.l.; 20 Jul. 2001; *R. Vásquez, R. Rojas & L. Campos 27528*; MO [MO-3009259], USM. – **Prov. Bongará** • Dist. Shipasbamba, along quebrada Fortuna; ca 1300 m a.s.l.; 6 May 1981; *K. Young & M. Eisenberg 330*; MO [MO-1835926]. – **Prov. Luya** • Camporedondo, montanas de “Jaype”; [6°08′ S, 78°20′ W]; 1600–1700 m a.s.l.; 25 Jun. 1991; *C. Díaz & L. Campos 4468*; MO [MO-1835910], USM • Camporedondo, Tullanya; 6°09′07″ S, 78°21′05″ W; 1550 m a.s.l.; 27 Nov. 1996; *C. Díaz & A. Peña 8699*; MO [MO-1642673], US [US00672848], USM. – **Cajamarca Region: Prov. San Ignacio** • Dist. Namballe, Vega del Toro; 4°58′46″ S, 79°05′01″ W; 800–1000 m a.s.l.; *R. Vásquez, R. Rojas, A. Peña & E. Chávez 25145*; MO [MO-1642631], US [US00672842], USM • Dist. Namballe, bosque Pacashal, margen derecho y arriba río Canchis; 4°58′ S, 79°10′ W; 650–800 m a.s.l.; 10 Jul. 1997; *E. Rodríguez R. & O. Pesantes 1667*; HUT, MO [MO-1642620], US [US00672846], USM. – **San Martín Region: Prov. Rioja** • Cerca Puente Naranjillo, carretera marginal Rioja-Chachapoyas; [5°40′ S, 77°40′ W]; 1000–1100 m a.s.l.; 5 Sep. 1974; *R. Ferreyra 18505*; USM • Dist. Nuevo Cajamarca, cerca del Poblado Palestina, camino a la Cueva Palestina; 5°54′ S, 77°21′ W; 890 m a.s.l.; 1 Nov. 1997; *I. Sánchez V. & M.O. Dillon 8386*; CPUN, F • Naciente río Negro; 910 m a.s.l.; [6°05′ S, 77°16′ W]; 16 Jul. 1995; *I. Sánchez Vega & M.O. Dillon 8071*; CPUN, F [2: V0086766F, V0086767F], US [US00673147]. – **Prov. Lamas** • Dist. Alonso de Alvarado, San Juan de Pacaipaza, km 72, carretera Tarapoto-Moyobamba; [6°16′ S, 76°46′ S], 1000–1050 m a.s.l.; 12 Jun. 1977; *J. Schunke V. 9702*; MO [MO-1642645], NY, U, US [US00222088], USM • Caserio El Progreso, Tarapoto-Yurimaguas road; 6°25′05″ S, 79°19′ W; 700 m a.s.l.; 25 Sep. 1986; *S. Knapp & K. Mallet 8441*; MO [MO-1642715], NY [NO00453979], USM • 20–27 km NE of Tarapoto, road to Yurimaguas, near top of Cordillera; [6°29′ S, 76°16′ W]; 900–1000 m a.s.l.; 21 Jul. 1982; *A.H. Gentry, D.N. Smith & R. Tredwell 37890*; MO [MO-1642679], USM. – **Prov. San Martín** • Dist. Tarapoto, Tarapoto; [6°27′ S, 76°20′ W]; Jun. 1856; *R.E. Spruce 3960*;

G-DC, K [K000006034], OXF • ibid.; [6°27′ S, 76°20′ W]; Jun. 1855; *R.E. Spruce 4826*; BM [BM000777906], E [E00299524], G-DC, K [2: K000006035, K000006036], NY • Carretera Tarapoto-Yurimaguas, from km 13–12; [6°27′ S, 76°19′ W]; ca 700 m a.s.l.; 16 Jun. 1980; *M. Rimachi Y. 5230*; US [US00222083]. – **Prov. Huallaga** • Dist. Saposoa, Al sur de Anazco Pueblo; [6°51′ S, 77°29′ W]; 2000 m a.s.l.; 3 Sep. 2000; *V. Quipuscoa S., S. Leiva G., Y. Díaz V. & M. Strarup J. 2344*; HUT, US [US00689821] • Route from Saposoa from El Dorad; 6°55′16″ S, 76°49′39″ W; 935 m a.s.l.; 5 Feb. 2016; *P.W. Moonlight & A. Daza 180*; E [E00885580], MO, MOL • Road from Tarapoto to Tocache; 7°44′31″ S, 76°39′39″ W; 917 m a.s.l.; 6 Feb. 2016; *P.W. Moonlight & A. Daza 186*; E [E00885579], MOL. – **Prov. Tocache** • Dist. Tocache, La quebrada de Huaquisha, margen derecha del río Huallaga; [8°05′ S, 76°36′ W]; 400 m a.s.l.; 15 Aug. 1969, *J. Schunke V. 3343*; NY [2], US [US00222091] • Nor oeste de la carretera marginal, 28 km de Tocache; [8°10′ S, 76°36′ W]; 525 m a.s.l.; 6 Jun. 1974; *J. Schunke V. 7168*; MO [MO-1642745], US [US00222089], USM • Entre Uchiza y Puente Huiete; [8°25′ S, 76°27′ W]; 400–500 m a.s.l.; 6 Aug. 1948; *R. Ferreyra 5162*; MOL, USM. – **Ucayali Region: Prov. Coronel Portillo** • Dist. Callería, Cuenca del río Utiquinia, quebrada Espjoyacu, afluente de la quebrada Manuela; 7°56.67′ S, 73°53.61′ W; 300 m a.s.l.; 21 Jul. 2003; *J.G. Graham 2412*; F [V0088040F], G, US [US01008601], USM [2] • Km 209 cerca Pucallpa; [8°24′ S, 74°36′ W]; 1 Aug. 1943; *C.A. Ridoutt 12865*; MO [MO-1652735], USM • Dist. Iparía, falda dentro las cuencas del río Ariapo y río Iparía, afluentes del río Ucayali, Reserva Comunal el Sira; 9°27.85′ S, 74°33.95′ W; 1550–1600 m a.s.l.; 30 Oct. 2009; *J.G. Graham 5154*; MOL, US [US01088861]. – **Prov. Padre Abad** • Dist. Padre Abad, cuenca del río Aguaytía, quebrada el Velo de la Novia; 9°03′ S, 75°48′ W; 30 Jun. 2004; *J. Schunke V. & J.G. Graham 15758*; F [V0088038F], G, MOL, US [US01008612] • Orilla del río Previsto, km 227; [9°04′ S, 75°42′ W]; 460 m a.s.l.; 9 Aug. 1943; *C.A. Ridoutt 12969*; MO [MO-1642718], USM • Dist. Padre Abad, Carretera Centro Poblado Yurac, margen izquierda río Yurac; 250–300 m a.s.l.; 9°05′ S, 75°32′ W; 28 Sep. 2004; *J. Schunke V. & J.G. Graham 16136*; F [V0088033F], G, MOL, US [US01008615]. – **Prov. Atalaya** • Road from Puerto Ocopa to Atalaya, km 58; 10°52′28″ S, 74°10′35″ W; 964 m a.s.l.; 14 Feb. 2016; *P.W. Moonlight & A. Daza 243*; E [E00885884], MO, MOL. – **Huánuco Region: Prov. Marañón** • La Merced, entre Situlli y cerca Santa Cruz ± km 86 de Tingo María; [8°39′ S, 76°17′ W]; 500–600 m a.s.l.; 3 Aug. 1948; *R. Ferreyra 4384*; USM • Centro poblado Chipaco, sector Nueva Sena; 9°14′05.21″ S, 76°29′42.77″ W; 1450 m a.s.l.; 24 Jul. 2021; *P. González & P. Arista 10071*; USM. – **Prov. Leoncio Prado** • Villa Isabel, valley Huallaga; [9°01′ S, 76°06′ W]; 520 m a.s.l.; 26 Jul. 1954; *F. Woytkowski 1246*; MOL • Shapagilla cerca a Tingo María; [9°13′ S, 75°59′ W]; 700–800 m a.s.l.; 19 Aug. 1947; *R. Ferreyra 896*; MO [MO-1642741], USM • Tingo María; [9°18′ S, 76°00′ W]; 31 Jul. 1942; *V. Cárdenas 12457*; USM. – **Prov. Huánuco** • Tulumayo cerca a Tingo María; [9°11′ S, 75°58′ W]; 600–700 m a.s.l.; 9 Jul. 1947; *R. Ferreyra 2399*; MO [MO-1642643], US [US00222120], USM [2] • Fundo Naranjillo, near Tingo María, highway Huánuco-Pucallpa; [9°15′ S, 76°00′ W]; 600–700 m a.s.l.; 6 Aug. 1947; *R. Ferreyra 2202*; MO [MO-1642646], US [US00222119], USM • Cayumba entre Huánuco y Tingo María; [9°39′ S, 75°57′ W]; 800–900 m a.s.l.; 15 Jul. 1948; *R. Ferreyra 4219*; MO [MO-1642720], MOL, USM. – **Pasco Region: Prov. Oxapampa** • Cahuapanas, on río Pichis; [10°00′ S, 74°59′ W]; ca 340 m a.s.l.; 20–21 Jul. 1929; *E.P. Killip & A.C. Smith 26753*; NY, US [US00222115v] • Dist. Palcazú, Comunidad Nativa Loma Linda-Laguna, Sector Nueva Aldea, Bosque de la Asociación Forestal Yanesha Concoll-Toroñ (AFYCT); 10°21′51″ S, 75°03′20″ W; 400 m a.s.l.; 16 Oct. 2008; *M. Huamán, J. Mateo & W. Gabriel 337*; HOXA, MO [MO-2217946], USM • Pichis trail, Eneñas; [10°45′ S, 75°13′ W]; 1600–1900 m a.s.l.; 30 Jun.–2 Jul. 1929; *E.P. Killip & A.C. Smith 25629*; NY, US [US00222114]. – **Junín Region: Prov. Chanchamayo** • arriba de Pampa Silva; [10°55′ S, 75°14′ W]; 1000–1200 m a.s.l.; 29 Aug. 1984; *R.A. Ferreyra & R. Fernández 20290*; USM [3]); Puyu Sacha field station; 11°05′41″ S, 75°25′57″ W; 2181 m a.s.l.; 23 Jun. 2014; *P.W. Moonlight & A. Daza 38*; E [E00835505], MOL • río Rondayacu, 45 km from San Ramón; 11°20′ S, 72°20′ W; 1880–1950 m a.s.l.; 15 Oct. 1982; *D.N. Smith, R.B. Foster & M. Palacios 2611*; F, MO [MO-1835938], USM. – **Prov. Satipo** • Satipo; [11°15′ S, 74°38′ W]; Aug. 1940; *C.A. Ridoutt 11424*; MO [MO-1642719], USM • Route from Mazamari to Puerto Ocopa, path to catarata Arco Iris; 11°18′02″ S, 74°27′21″ W; 599 m a.s.l.; 14 Feb. 2016; *P.W. Moonlight &*

*A. Daza 240*; E [E00885885], G, MOL • Route from Comas to Satipo; 11°26′17″ S, 74°46′31″ W; 1511 m a.s.l.; 13 Feb. 2016; *P.W. Moonlight & A. Daza 238*; E [E00885577], MOL, P. – **Prov. Jauja** • Road from Monobamba to Jauja, valley of río Tulumayo; 11°13′42″ S, 75°20′02″ W; 975 m a.s.l.; 17 Feb. 2016; *P.W. Moonlight & A. Daza 262*; MOL • Road from Monobamba to Uchumayo; 11°28′12″ S, 75°15′35″ W; 1950 m a.s.l.; 17 Feb. 2016; *P.W. Moonlight & A. Daza 269*; E [E00885575], MO. – **Prov. Tarma** • *A. Weberbauer 10081*; USM [2] • Colonia del Perené; [10°53′ S, 75°13′ W]; 900–1000 m a.s.l.; Sep. 1920; *A. Weberbauer 46*; USM • Pampa Tigre; [10°59′ S, 75°12′ W]; 1500–1600 m a.s.l.; 8 Sep. 1985; *R.A. Ferreyra & C. Díaz 20504*; USM [2]. – **Madre de Dios Region: Prov. Manu** • Cocha Cashu uplands; 11°45′ S, 71°00′ W; 400 m a.s.l.; 7 Aug. 1986; *P. Nuñez 5636*; MO [MO-1643522], US [US00222097], USM • Vicinity of Cocha Cashu Station, Parque Nacional de Manu; [11°50′ S, 71°25′ W];

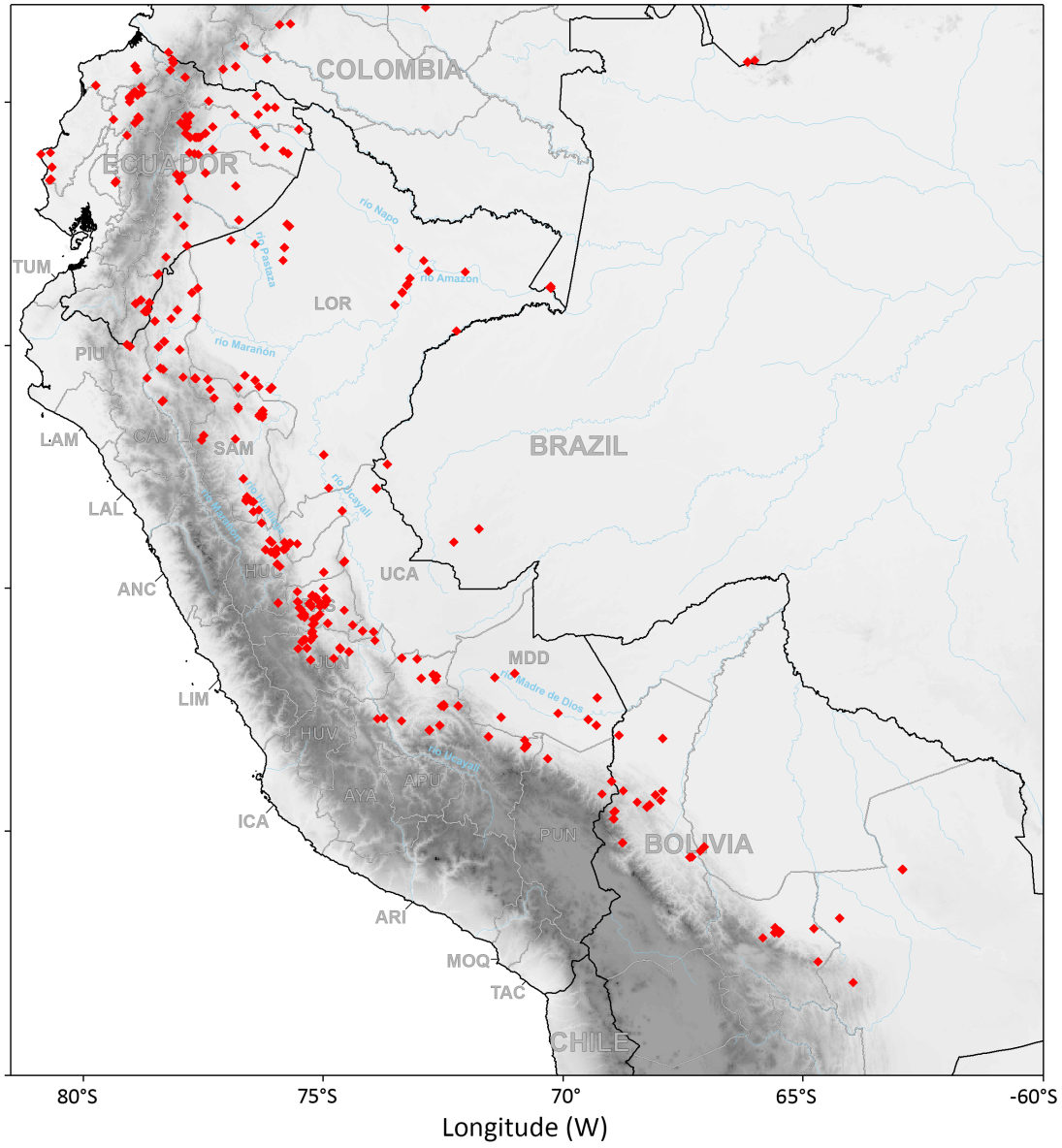


**Fig. 88.** Distribution of *Begonia* sect. *Wageneria* (Klotzsch) A.DC. in Peru and surrounding countries: *B. glabra* Aubl. (red). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

400 m a.s.l.; 18 Jul. 1977; *R.B. Foster 6429*; MO [MO-1642610], US [US00222087], USM • Pantiacolla, serrania across río Madre de Dios from Shintuya; [12°39′ S, 71°17′ W]; 480–840 m a.s.l.; 29 Oct. 1979; *A.H. Gentry, J. Terborgh, J. Aronson & R. Ramirez 27355*; MO [MO-1642695]. – **Prov. Tambopata** • W of CICRA Camp, trail to Cocha Lobo; 12°34.166′ S, 70°6.024′ W; 11 Aug. 2004; *P. Acevedo R., M. Chocce & P. Maceda 14311*; US [US01060990] • Zona reservada de Tambopata, 12°49′ S, 89°18′ W; 280 m a.s.l.; 11 Aug. 1990; *C. Reynel & E. Meneses 5054*; MO [MO-1642696]. –**Cusco Region: Prov. La Convención** • en C.N. Nueva Luz, río Urubamba; [11°27′ S, 73°02′ W]; 11 Feb. 1996; *M.I. Toribio 374*; USM • Trail along río Mapituriani, a tributary of the Apurimac, opposite Hacienda Luisiana; [12°23′ S, 72°29′ W]; 1000 m a.s.l.; 14 Sep. 1976; *D.C. Wasshausen & F. Encarnación 653*; K, NY, US [US00222082], USM • Dist. Santa Ana, Poromate, 12°54′59″ S, 72°47′02″ W; 961 m a.s.l.; 21 Jul. 2004; *W. Galiano, E. Suclli & A. Rodríguez 6802*; MO [MO-1102814]. – **Prov. Paucartambo** • Atalaya, near junction with río Carbon and río Alto Madre de Dios; [12°53′ S, 71°22′ W]; 27 Aug. 1973; *R.B. Foster 2755*; F, USM • Keros, Valle Kosñipata; [13°01′ S, 71°26′ W]; 950 m a.s.l.; 23–31 Jul. 1948; *R. Scolnik 908*; US [2: US00222076, US00222077] • Kosñipata Valley, km 150, San Pedro, río Unión and río Kosñipata junction; [13°04′ S, 71°34′ W]; 1800 m a.s.l.; 20 Mar. 1990; *P. Núñez 11983*; MO [MO-1642697]. – **Prov. Quispicanchi** • Quincemil; 13°13′ S, 70°45′ W; 643 m a.s.l.; 24 Jul. 1991; *P. Núñez 13867*; MO [MO-1835946], USM • Camanti, Maniri, el Cerro Camanti; 13°17′ S, 70°48′ W; 720 m a.s.l.; 24 Aug. 1990; *M. Timaná 728*; MO [MO-1835931], USM. – **Ayacucho Region: Prov. La Mar** • río Catute, 2 km NW of Santa Rosa; [12°40′ S, 73°43′ W]; 680 m a.s.l.; 8 Sep. 1976; *D.C. Wasshausen & F. Encarnación 612*; K, MO [MO-1642624], NY, US [US00222081], USM • Aina, between Huanta & río Apurimac; [12°41′ S, 73°52′ W]; 750–1000 m a.s.l.; 7–17 Mar. 1929; *E.P. Killip & A.C. Smith 22763*; NY, US [US00222109] • Between Tambo San Miguel, Anya, and the Hacienda Luisiana; 12°43′ S, 73°50′ W; ca 1580 m a.s.l.; 18 Aug. 1968; *T.R. Dudley 11841*; US [US00222096]. – **Puno Region: Prov. Sandia** • Between río Azata-Colorado; [13°58′ S, 68°59′ W]; 1100 m a.s.l.; 26 Jun. 1986; *P. Núñez & C. Muñoz 5284*; MO [MO-1642727] • San Juan del Oro; [14°14′ S, 69°11′ W]; 1900 m a.s.l.; May 1977; *S. Antunez 159*; USM.

**Description**

Caulescent herb, to at least 5 m high. *Stem* scandent, branching, rooting at the nodes; internodes to 13 cm long, to 7 mm thick, succulent, pale green to brown or red, glabrous. *Stipules* persistent, triangular, 5–32 × 2–8 mm, apex acuminate, translucent, white to pale green, glabrous, margin entire, aciliate. *Leaves* > 5, alternate, basifixed; petiole 0.5–5.5 cm long, pale green to red, glabrous; blade subsymmetric, ovate, to 15 × 9.5 cm, succulent, apex short-acuminate, base truncate, margin entire to denticulate or rarely dentate, aciliate to ciliate, upper surface green, glabrous, lower surface pale green, glabrous, 3-veined from the base, with 2–4 secondary on both sides of the blade. *Inflorescences* 1–3 per stem, bisexual, axillary, erect to pendulous, cymose, with 6–8 branches, bearing up to 256 staminate flowers and 128 pistillate flowers, protandrous; peduncle to 20 cm long, pale green flushed red, glabrous, bracts late deciduous, lanceolate, 0.5–3 × 0.2–0.8 mm, translucent, white, glabrous, apex acuminate, margin entire, aciliate. *Staminate flowers*: pedicels to 12 mm long, glabrous; tepals 4, spreading, outer 2 ovoid to spherical, 2.5–8 × 2–5 mm, apex obtuse to rounded, white flushed pink, glabrous, margin entire, aciliate, inner 2 elliptic to ovate, 2.5–6 × 2–3 mm, apex rounded, white flushed pink, glabrous, margin entire, aciliate; stamens 8–25, projecting, yellow, filaments 1–2.5 mm long, fused at the base, anthers ellipsoid, 1–1.5 × 0.2–0.4 mm, dehiscing via lateral slits, connectives extended to 0.2 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 15 mm long; bracteoles lacking; tepals 5, subequal, deciduous in fruit, spreading, elliptic to ovate, 4–8 × 2–5 mm, apex obtuse, white flushed red, glabrous, margin entire, aciliate; ovary body ellipsoid, 2–9 × 0.5–4 mm, pale green, white, or pink, glabrous, unequally 3-winged, largest wing triangular, 2–8 × 2.5–6 mm, smallest ridgelike, to 0.5 mm wide; 3-locular, placentae branches entire, bearing ovules on both surfaces; styles 3, yellow, free, 2–5 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 15 mm long. *Fruit body* ovoid,

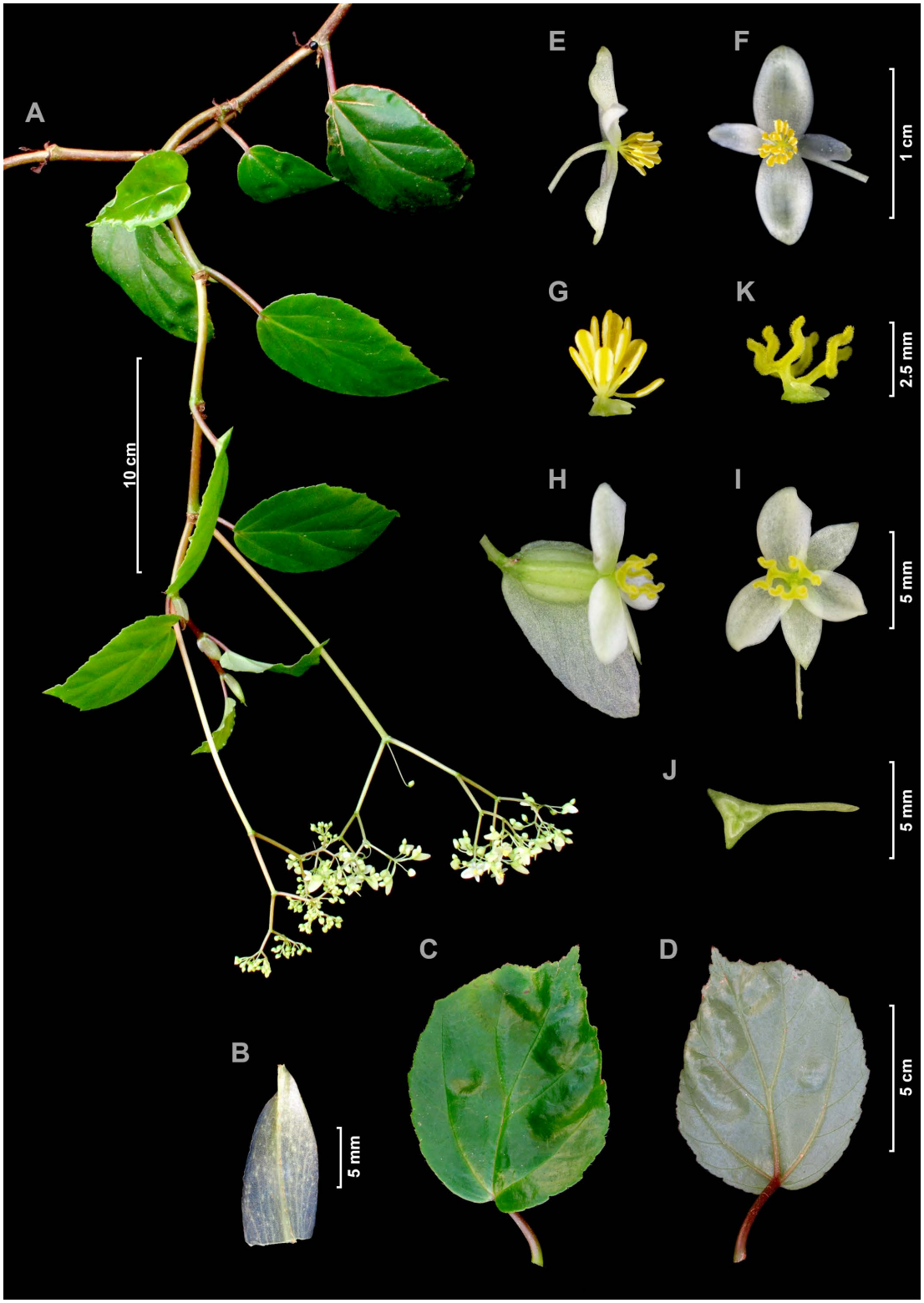


**Fig. 89.** *Begonia glabra* Aubl. **A**. Habit. **B**. Stipule. **C**. Leaf, adaxial surface. **D**. Leaf, abaxial surface. **E**. Staminate flower, side view. **F**. Staminate flower, front view. **G**. Androecium, side view. **H**. Pistillate flower, side view. **I**. Pistillate flower, front view. **J**. Cross section of ovary. **K**. Pistils, side view. All photographs taken by D.A. Purvis in the living collections of the Royal Botanic Garden Edinburgh (Accession 20101699, of unknown origin).

to 9 × 6 mm, drying brown, wings same shape as in ovary, the largest expanding to 12 × 16 mm, the smallest expanding to 3 mm wide.

**Proposed conservation assessment**

Widespread and often extremely common species, with an EOO of > 10 000 000 km$^2$ and found in numerous protected areas. We assess *B. glabra* as Least Concern (LC).

**Synonymy notes**

Previous authors have treated the name *B. populifolia* Schott as a later homonym on account of the earlier publication of *B. populifolia* Kunth (Humboldt *et al.* 1825: 185). However, in the protologue of *B. populifolia* Schott, the author states the name "est. *B. scandens* Sw.", implying he knew this was the same species as *B. scandens* (now a synonym of *B. glabra*). The name *B. populifolia* Schott is therefore an invalid, rejected name rather than an illegitimate later homonym.

**Typification notes**

*Begonia scandens* is a superfluous name because the author cited the earlier name *B. glabra* in synonymy (Swartz 1788: 86). No type was cited under the protologue of *B. scandens* so, the type of *B. scandens* is the same as the type of *B. glabra* (Turland *et al.* 2018: Article 7.5).

The protologue of *B. locellata* A.DC. cited the collection *Jurgensen* 958 but no herbarium was cited (de Candolle 1859: 137) so a lectotype is required. A duplicate of this collection in Kew herbarium (K000536562) has a determination slip by Alphonse Pyramus de Candolle and is an excellent specimen so we designate it as the lectotype.

*Begonia elliptica* Kunth was described based upon material collected by Humboldt and Bonpland close to Jaen in the Cajamarca Region of Peru (Humboldt *et al.* 1825: 180). There are two sheets matching this description in Paris herbarium and we designate one of these (P00679512) as the lectotype as it is the more complete specimen.

The protologue of *B. lucida* Otto & A.Dietr. does not cite a type collection so a lectotype or neotype is likely needed (Otto & Dietrich 1848: 162). We have not been able to conduct a full search of the principal herbaria of either Otto (LB or S) or Dietrich (HBP) to search for original material, so refrain from designating a neotype.

The name *B. physalifolia* Liebm. was published on the basis of material collected in Costa Rica by C. Ørsted near Naranjo at an elevation of 5000 feet (Liebmann 1852: 19). A specimen in Cophenhagen herbarium of *C. Ørsted s.n.* (C10008256) is an excellent match for this description so we designate it as the lectotype.

*Wageneria deflexa* Klotzsch was described based upon material grown in Berlin botanic gardens and the collection *H. Wagener 2543* held in the garden's herbarium (Klotzsch 1855: 233). We have not visited this herbarium and located this specimen but cite it as a holotype. It may be that there are multiple sheets of this collection in Berlin, so one may need designating as a lectotype.

Klotzsch described *Wageneria montana* Klotzsch based upon material collected by Ruiz and Pavón in the now abandoned village of Muña in Huánuco Region (Klotzsch 1855: 235). No herbarium was cited, so a lectotype is required. We have seen two specimens of *B. glabra* collected by Ruiz and Pavón: one in Oxford University herbarium and the second in Madrid. The labels of neither of these specimens indicate that they were collected in Muña so they cannot be considered syntypes. We have not carried

out an exhaustive search of European herbaria for matching specimens so refrain from designating a type for this name.

*Begonia scandens* var. *amplifolia* A.DC. was described from three sheets collected by Poeppig in Peru (de Candolle 1864: 362). These were *E.F. Poeppig 1928* and *1063* collected in Pampayaco and held in the Boissier herbarium, and *E.F. Poeppig 1928* collected in Tocache and held in Vienna herbarium (de Candolle 1864: 362). We have seen no duplicates of *E.F. Poeppig 1928* there are several sheets of *E.F. Poeppig 1063* held in Vienna and Berlin herbaria. These sheets however show material of *B. glauca* and *B. cyathophora*, rather than a variety of *B. glabra*. Most of Poeppig's Peruvian *Begonia* collections are mixed collections so it seems likely that the same is true of *E.F. Poeppig 1063*. We treat *B. scandens* var. *amplifolia* as a synonym of *B. glabra* but refrain from designating a type until the cited syntypes have been seen.

The protologue of *B. hoegeana* Regel & Schmidt cites material collected by C.T. Hoege in Jalapa Department, Guatemala (von Regel & Schmidt 1886: 398). Hoege was primarily a herpetologist but also collected plant specimens. We have not seen any matches that matches this description but have by no means carried out a thorough search of all likely herbaria. We do not designate a type for this name.

*Begonia repens* Sessé & Moç. was described based upon material collected by Sessé and Moçino in Mexico (Sessé & Moçino 1894: 219). We lectotypify this name based upon a sheet of *M. Sessé & J.M. Moçino 4512* held in MA herbarium (MA603076) that matches the description and is labelled as "*Begonia repens*".

The name *B. glabra* var. *coralipetiolaris* Anon. was described without a type (Anonymous 1946: 153), as types were not a requirement until 1958, this does not invalidate the name. We know of no material that could be considered original material and refrain from designating a type.

**Identification notes**

*Begonia glabra* is by far the most common climbing *Begonia* in Peru and is abundant in humid forests. Together with *B. rossmanniae*, it is one of two species of climbing Peruvian *Begonia* with basifixed leaves that are three-veined from the base. It is readily distinguished by its persistent (vs deciduous) stipules and axillary, symmetrical inflorescences (vs asymmetrical and terminal inflorescences).

## *Species unplaced to section*

There are six species of *Begonia* from Peru that do not fit into the sectional classification provided by Moonlight *et al.* (2018). Four of these six species were included in the phylogeny provided by Moonlight *et al.* (1018) but the authors took a cautious approach to redefining the limits of existing sections or describing new sections. Changes were only made where enough species in sections and their relatives were sampled, where phylogenetic relationships were well supported, and where clades were supported by morphology. All Peruvian species that were left unplaced to section fall within the broad definition of *B.* sect. *Knesebeckia* provided by Doorenbos *et al.* (1998), but this section is highly polyphyletic so many recently described species have been left unplaced to section (Moonlight *et al.* 2018).

71. ***Begonia bifurcata*** L.B.Sm. & B.G.Schub.
Figs 90A, 91

*Journal of the Washington Academy of Sciences* 45 (4): 113, fig.1 (Smith & Schubert 1955). – **Type**: PERU – **Piura Region: Prov. Huancabamba** • Above Canchaque; [5°22′ S, 79°36′ W];

1500–1600 m a.s.l.; 22 Mar. 1948; *R. Ferreyra 3103*; holotype: US [US00115253]; isotypes: GH [GH00068216], USM [USM000210].

Brako & Zarucchi (1993: 191); León & Monsalve (2006: 165).

### Etymology

The species is named for its bifurcating styles, which are unusual among tuberous Peruvian *Begonia* species.

### Specimens examined

PERU – **Piura Region: Prov. Huancabamba** • Carretera entre Canchaque y Huancabamba, km 16 al 25 desde Canchaque; [5°22′ S, 79°36′ W]; 1900–2200 m a.s.l.; 17 Apr. 1987; *C. Díaz & S. Baldeón M. 2419*; F, MO [MO-098024] • ibid.; 5°23′03″ S, 79°35′47″ W; 1626 m a.s.l.; 26 Jan. 2016; *P.W. Moonlight & A. Daza 105*; MOL • ibid.; 5°22′08″ S, 79°34′26″ W; 1835 m a.s.l.; 26 Jan. 2016; *P.W. Moonlight & A. Daza 110*; E [E00885543], G, MO, MOL • ibid.; 5°22′34″ S, 79°34′33″ W; 2122 m a.s.l.; 27 Jan. 2016; *P.W. Moonlight & A. Daza 117*; E [E00885886], MO, MOL, HUT • Arriba de Canchaque; [5°22′ S, 79°36′ W]; 1400–1600 m a.s.l.; 22 May 1948; *R. Ferreyra 3100*; USM • ibid.; 22 May 1948; *R. Ferreyra 3132*; USM • Dist. Canchaque, Chorro Blanco; [5°20′ S, 79°36′ W]; 1500–1900 m a.s.l.; 18 Apr. 1987; *C. Díaz & S. Baldeón M. 2473*; F, MO [MO-098023], USM • ibid.; *C. Díaz & S. Baldeón M. 2480*; MO [MO-098022] • Entre Palamba y Turmalina, ruta a Huancabamba; [5°23′ S, 79°36′ W]; 1900 m a.s.l.; 30 Apr. 1988; *I. Sánchez V., A. Correa & M. Uaras 5114*; CPUN. – **Cajamarca Region: Prov. San Ignacio** • Dist. San José de Lourdes, Caserío Estrella del Oriente; 4°50′ S, 78°55′ W; 1500–1650 m a.s.l.; 14 Nov. 1988; *E. Rodríguez R. & S. Leiva G. 2107*; HUT.

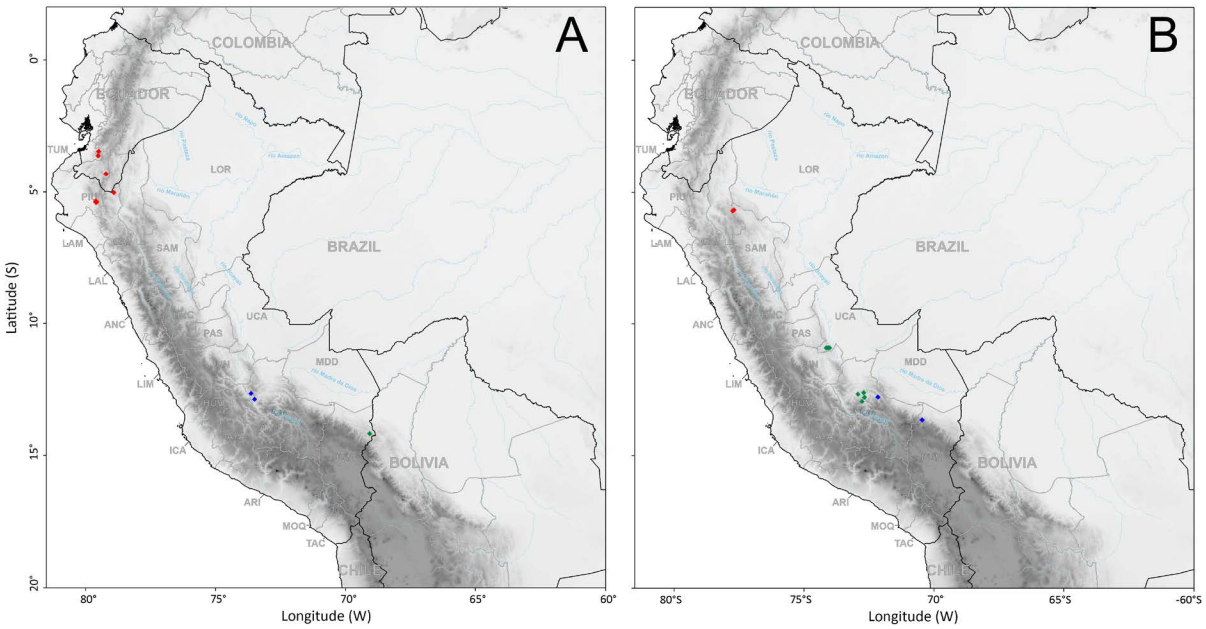


**Fig. 90.** Distribution of the *Begonia* sect. *Ignota* in Peru and surrounding countries. **A**. *B. bifurcata* L.B.Sm. & B.G.Schub. (red), *B. erythrothrix* Tebbitt & Moonlight (red), and *B. occultata* J.P.Allen & Moonlight sp. nov. (green). **B**. *B. speculum* Moonlight & Tebbitt (red), *B. thyrsoidea* Irmsch., and *B. urubambensis* Tebbitt (green). Black lines indicate country borders, grey lines indicate major administrative divisions, blue lines indicate rivers, and shading indicates elevation.

**Description**

Caulescent, tuberous herb, to 30 cm high. *Tuber* ellipsoid to spheroid, 5–16 × 2–4 cm, with 1 growing point. *Stem* erect, unbranched; internodes to 14 cm long, to 8 mm thick, succulent, pale green, sparsely to densely hirsute. *Stipules* persistent on the tuber, deciduous on the stem, triangular, 5–8 × 3–4 mm, apex acute, translucent, white, glabrous, margin lacerate, ciliate. *Leaves* 1–3, alternate, basifixed; petiole 2–13 cm long, pale green, densely hirsute, hairs vivid red tipped white; blade asymmetric, ovate, to 24 × 23 cm, succulent, apex broadly-acuminate, base truncate to cordate, basal lobes not overlapping to overlapping, sinus to 70 mm deep, margin irregularly dentate, ciliate, upper surface yellow-green to green, glandular-pilose, lower surface pale green, densely hirsute on the veins, glandular-pilose on the lamina, veins palmate but with 1 primary vein, 7–9 veined from the base, with 2–4 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with 4 branches, bearing up to 4 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 9.5 cm long, pale green, sparsely-villous, the hairs red tipped white, bracts persistent, lanceolate, 3–5 × 1.5–2.5 mm, opaque, pale green, glabrous, apex acute, margin lacerate, ciliate. *Staminate flowers*: pedicels to 45 mm long, sparsely pubescent; tepals 4, spreading, outer 2 ovate, 6–13 × 4–7 mm, apex rounded, white, sometimes flushed red outside, glabrous inside, glandular pilose outside, the hairs red, margin entire, aciliate, inner 2 ovate, 5–11 × 3–7 mm, apex rounded, white, glabrous, margin entire, aciliate; stamens ca 35, spreading, yellow, filaments 1–2 mm long, fused into an irregularly branching column, anthers ellipsoid, 1–1.5 × 0.1 mm, dehiscing via lateral slits, connectives extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 25 mm long; bracteoles lacking; tepals 5, subequal, persistent in fruit, projecting, the largest ovate, 6–8 × 3–5 mm, apex obtuse, white, pilose on the outside, glabrous inside, margin entire, aciliate, the smallest ovate, 4–5 × 3–4 mm, apex obtuse, pilose on the outside, glabrous inside, margin entire, aciliate; ovary body obovoid, 7–8 × 5–6 mm, white, glandular pilose, unequally 3-winged, the largest wing triangular, 6–10 × 10–11 mm, smallest marginal 1–2 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 2–3 mm long, once-divided, stigmatic papillae in a spirally twisted band. *Fruiting pedicel* to 30 mm long. *Fruit body* obovoid, to 9 × 6 mm, drying brown, largest wing same shape as in ovary, expanding to 13 mm tall, smallest wings expanding to a triangle 5 mm wide and 8 mm tall.

**Proposed conservation assessment**

Previously assessed by León & Monsalve (2016) as Endangered (EN B1a). The species has now been identified from one locality in Cajamarca Province and three localities in Ecuador, and its EOO has been extended to 8000 km$^2$. Fieldwork in 2016 demonstrated that *B. bifurcata* is abundant at its type locality, and at least 5000 individuals were observed on 5 km stretch of road. This EOO and number of known localities are sufficiently small to qualify *B. bifurcata* as Vulnerable, but there are no known threats to the species or any of its populations. We assess *B. bifurcata* as Least Concern (LC).

**Identification notes**

*Begonia bifurcata* is most similar to *B. parcifolia* (see Identification notes for *B. parcifolia*) but may also be confused with *B. erythrothrix*, another acaulescent species with a dense indumentum of red hairs. *Begonia bifurcata* is a tuberous species and has a red, glandular pilose indumentum to the outer surface of the tepals on both its staminate flowers whereas *B. erythrothrix* is rhizomatous and has glabrous tepals.

**Distribution and ecology**

Known from Ecuador and Peru. Within Peru known from Piura and Cajamarca Regions (Fig. 90A) and found in northwest Peruvian relict montane Forest at an elevation of 1400–2200 m a.s.l. and middle montane Forest at an elevation of 1500–1650 m a.s.l. *Begonia bifurcata* is a tuberous species and dies back in the dry season to a tuber before flowering at the start of the dry season (January to May). Only

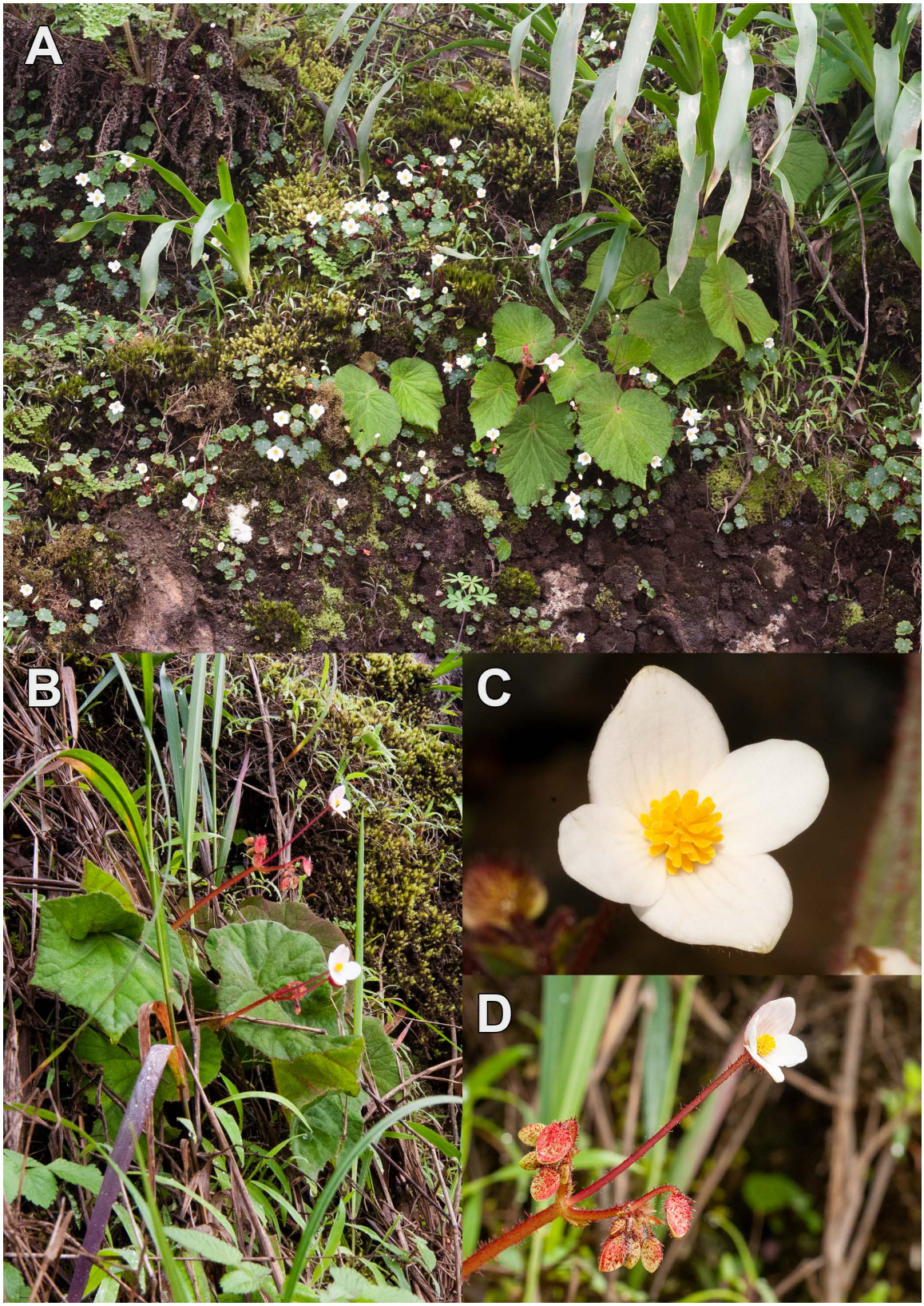


**Fig. 91.** *Begonia bifurcata* L.B.Sm. & B.G.Schub. **A**. Habitat. **B**. Habit. **C**. Staminate flower, front view. **D**. Inflorescence. All photographs by P.W. Moonlight from *P.W. Moonlight & A. Daza 117* in Huancabamba Province, Piura Region.

a single specimen is known from Cajamarca Region, but the flowering period may be different as this specimen was in flower in November.

### 72. ***Begonia erythrothrix*** Tebbitt & Moonlight
Fig. 90A

*Edinburgh Journal of Botany* 74 (2): 116 (Moonlight & Tebbitt 2016). – **Type**: PERU – **Cusco Region: Prov. La Convención** • Dist. Echarate, E río Apurimac, NE Pueblo Libre, up mountain of Anchihuay & Bellavista, south Cordillera Vilcabamba; 12°51′ S, 73°30′ W; 2445 m a.s.l.; 3 Aug. 1998; *P. Nuñez, R. de la Colina & S. Udvardy 23400*; holotype: CUZ; isotypes: US [US00625233], USM.

#### Etymology

The epithet derives from the Greek words '*erythro*' and '*thrix*', meaning the 'red haired' *Begonia*.

#### Specimen examined

PERU – **Cusco Region: Prov. La Convención** • Knox's cascade, ca 2 km NW of camp 2½; 12°38′ S, 73°03′ W; 29 Jun. 1968; *T.R. Dudley 10618*; US [US01925935].

#### Description

Acaulescent, rhizomatous herb, to 15 cm high. *Rhizome* ellipsoid, 0.1–0.8 × 4 cm, with numerous growing points. *Stipules* persistent, ovate, 0.3–1 × 0.2–0.4 mm, apex acute, opaque, brown, glabrous, margin entire, aciliate. *Leaves* 1–4, alternate, basifixed; petiole 1.2–10.5 cm long, colour unknown, densely hispid, hairs red; blade asymmetrical, ovate, to 11 × 6 cm, succulent, apex acuminate, base cordate, basal lobes not overlapping, sinus to 10 mm deep, margin serrate, ciliate, upper surface yellow-green, pink to red on the veins, sparsely pubescent, lower surface red-purple maculate, sparsely to moderately pubescent, veins palmate, ca 6 veined from the base. *Inflorescences* 1–3, bisexual, axillary, erect, an asymmetrical cyme, with 4 branches, bearing up to 4 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 11.5 cm long, colour unknown, moderately glandular hispid, bracts late deciduous, ovate, ca 3 × 1–2 mm, opaque, colour unknown, glabrous, apex acute, apiculate, margin entire, aciliate. *Staminate flowers*: pedicels to 18 mm long, glabrous; tepals 4, spreading, outer 2 elliptic, 0.6–2 × 0.3–1 mm, apex obtuse, white tinged pink or red, glabrous, margin entire, aciliate, inner 2 obovate, 0.6–2.2 × 0.3–1.2 mm, apex obtuse, white, glabrous, margin entire, aciliate; stamens 15–30, projecting, yellow, filaments 1–2 mm long, fused into a 2–3 mm long column, anthers sub-globose, 0.5–0.75 × 0.5 mm long, dehiscing via lateral slits, connectives not projecting, symmetrically basifixed. *Pistillate flowers*: pedicels to 1.8 mm long; bracteoles lacking; tepals 5, subequal, deciduouss in fruit, spreading, the largest ovate to elliptic, 6.5–13 × 4–7 mm, apex subacute, white, glabrous, margin entire, aciliate, the smallest elliptic, 6.5–1.3 × 0.6–9.5 mm, apex obtuse, white, glabrous, margin entire, aciliate; ovary body broadly ellipsoid, 3–10 × 2–5 mm, colour unknown, glabrous, unequally 3-winged, wings subtriangular, largest 3–10 × 2–7 mm, smallest 3–10 × 2–4 mm; 3-locular, placentae unknown; styles 3, yellow, fused at the base, 2.5–4 mm long, 2-lobed, stigmatic papillae in a spiral band. *Fruiting pedicel* to 22 mm long. *Fruit body* ovoid, to 10 × 10 mm, drying brown, wings same shape and size as in ovary.

#### Proposed conservation assessment

Assessed by Moonlight & Tebbitt (2016) as Data Deficient (DD).

### Identification notes

*Begonia erythrothrix* is the only *Begonia* species in Peru with a creeping, aboveground rhizome; four tepals on the staminate flower; and an indumentum of red, hispid hairs.

### Distribution and ecology

Endemic to Peru and Cusco Region (Fig. 90A) where it is found in middle and possibly lower montane Forest at an elevation of ca 1150–2445 m a.s.l. *Begonia erythrothrix* is rhizomatous and may die back to its rhizome at some point of the year. The species has been collected in flower and fruit in June and July.

## 73. ***Begonia occultata*** J.P.Allen & Moonlight sp. nov.

urn:lsid:ipni.org:names:77323298-1

Figs 90A, 92

### Diagnosis

Most similar to *B. cremnophila* Tebbitt but differing in its glabrous leaves (vs sparsely pilose to sparsely pubescent on the upper surface, pilose on the veins on the lower surface); its lanceolate bracts with an entire, aciliate margin (vs obovate with a denticulate, ciliate margin); and tepals that do not persist in fruit.

### Etymology

The epithet derives from the Latin '*occultatus*', meaning 'hidden' or 'concealed'. It refers to the species' patterned leaves, which are camouflaged against the forest floor.

### Type

PERU – **Puno Region: Prov. Sandia** • Dist. San Pedro de Putina Punco, ca 7.5 km S of San Pedro de Putina on the road 34H to San Juan del Oro; 14°09′17″ S, 69°04′08″ W; 1068 m a.s.l.; 6 Feb. 2021; *J.P. Allen 2*; holotype: HUT [61143].

### Description

Acaulescent, rhizomatous herb, to 32 cm high. *Rhizome* discoid to ellipsoid, 2.5–7 × 3–5 cm, with 1 growing point. *Stipules* persistent, triangular, 3–4.5 × 5.5–12 mm, apex acute, apiculate, translucent, green flushed red, glabrous, margin entire, aciliate. *Leaves* 2–4, alternate, basifixed; petiole 1.5–11 cm long, deep red, glabrous; blade asymmetric, transversely ovate, to 21.5 × 15.5 cm, succulent, apex acute, base cordate, basal lobes overlapping, sinus to 35 mm deep, margin repend, ciliate, upper surface dark green, the veins flushed pale green and flecked silver, often iridescent blue, glabrous, lower surface deep red, the veins flushed pale green, sparsely scabrous, veins palmate with one major vein, 6–8 veined from the base, with 2–4 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with 2 branches, bearing up to 6 staminate flowers and 3 pistillate flowers, protandrous; peduncle to 26.5 cm long, red, glabrous, bracts deciduous, triangular, 2–4.5 × 3.5–10 mm, translucent, pale green, glabrous, apex acute, margin entire, aciliate. *Staminate flowers*: pedicels to 13.5 mm long, glabrous; tepals 4, spreading, outer 2 broadly ovate, 4.5–9.5 × 5–7.5 mm, apex obtuse, base rounded, white, glabrous, margin entire, aciliate, inner 2 oblanceolate, 4.5–7 × 2–4.5 mm, apex rounded, base cuneate, white, glabrous, margin entire to serrulate, aciliate; stamens ca 25, spreading, pale green, filaments ca 2.5 mm long, fused at the base, anthers obovoid, 1.2 × 0.8 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 5.5 mm long; bracteoles lacking; tepals 5, subequal, deciduous in fruit, projecting, elliptic to ovate, 4–7.5 × 1.5–3.5 mm, apex obtuse, white, flushed pink outside, glabrous, margin entire, aciliate; ovary body broadly ovate, ca 3.5 × 2.5 mm, green flushed red, glabrous, unequally 3-winged, the largest

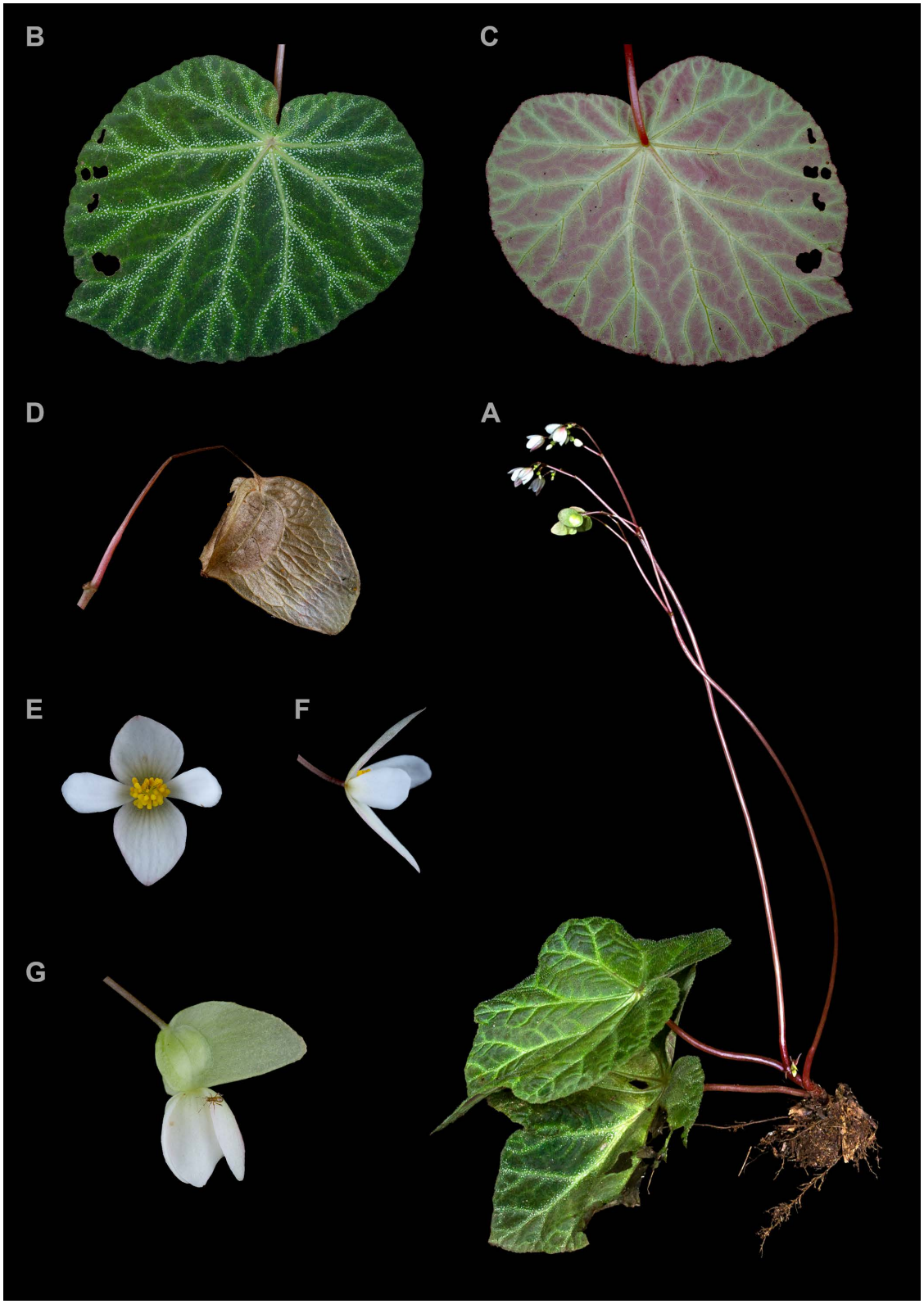


**Fig. 92.** *Begonia occultata* J.P.Allen & Moonlight sp. nov. **A**. Habit. **B**. Leaf, adaxial surface. **C**. Leaf, abaxial surface. **D**. Fruit, side view. **E**. Staminate flower, front view. **F**. Staminate flower, side view. **G**. Pistillate flower, side view. All photographs taken by J.P. Allen from *J.P. Allen 2* in Sandia Province, Puno Region.

wing triangular, ca 6 × 5 mm, smallest semi-circular, rib-like ca 1.5 mm wide; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, ca 2.5 mm long, once-divided, stigmatic papillae in a twice spirally-twisted band. *Fruiting pedicel* to 20 mm long. *Fruit body* ovoid, to 9.5 × 6.5 mm, drying brown, wings same shape as in ovary, the largest expanding to 13.5–20 mm, the smallest expanding to 4 mm wide.

**Proposed conservation assessment**

Known from a single population immediately adjacent to the main road through Sandia Province. During fieldwork in November 2020 and February 2021, ca 50 individuals were observed and a second population with ca 15 individuals was located ca 8 km southwest along the 34H at 14°12′57″ S 69°06′40″ W. Both populations are within 50 m of a main road and 300 m of built-up areas. Given the species' small range and population size, and its proximity to a major road and human habitation, we assess *B. occultata* sp. nov. as Critically Endangered (CR B1ab(iii); C1+2a(i)).

**Notes**

The new species does not fit into any of the two large sections of tuberous Andean *Begonia*. It differs from species in *B.* sect. *Eupetalum* in its bifid rather than multifid styles, and from *B.* sect. *Australes* in lacking a stem. It is most similar to *B. cremnophila*, which is found ca 750 km to the southwest in Chuquisaca and Santa Cruz Departments, Bolivia. *Begonia cremnophila* was included in recent molecular phylogeny (Moonlight *et al.* 2018) and was placed among a diverse group of Andean species that remain unplaced to section. We therefore treat *B. occultata* sp. nov. as unplaced to section.

**Identification notes**

*Begonia occultata* sp. nov. is difficult to distinguish from the southern Bolivian endemic species *B. cremnophila* (see Diagnosis). Within Peru, however, it is recognised as the only acaulescent and tuberous *Begonia* with no indumentum and a distinct apex to the leaf.

**Distribution and ecology**

Endemic to Peru and Puno Region (Fig. 90A). Found within lower montane forest at an elevation of 1050–1200 m a.s.l. *Begonia occultata* sp. nov. is tuberous and has been observed emerging from dormancy at the start of the wet season in September and flowering and fruiting in February. The tubers were collected on a moist bank in relatively seasonal montane forest where the patterned leaves are very inconspicuous, perhaps acting like camouflage.

74. ***Begonia speculum*** Moonlight & Tebbitt
Figs 90B, 93

*Edinburgh Journal of Botany* 74 (2): 112 (Moonlight & Tebbitt 2016). – **Type**: PERU – **San Martín Region: Prov. Rioja** • Bosque de Protección Alto Mayo (BPAM), road from Amazonas to Rioja, km 393; 5°40′11″ S, 77°41′24″ W; 1335 m a.s.l.; 2 Feb. 2016; *P.W. Moonlight & A. Daza 158*; holotype: MOL; isotypes: E [E00833930], MO [MO-3237363], USM.

**Etymology**

The epithet is the Latin noun '*speculum*', which means 'mirror'. It refers to the relatively symmetrical leaves of this species.

**Specimens examined**

PERU – **San Martín Region: Prov. Rioja** • Road from Pedro Ruiz to Rioja, km 393; 5°40′11″ S, 77°51′23″ W; 1297 m a.s.l.; 4 Jul. 2018; *P.W. Moonlight 1261*; USM • Bosque de Protección de Alto Mayo (BPAM); 5°42′ S, 77°44′ W; 1700–1800 m a.s.l.; 9 Jul. 2010; *M.M. Mora & J. Pérez 883*; USM.

**Description**

Caulescent, tuberous herb, to 15 cm high. *Tuber* sub-globose, 1.5–2 × 1.5–3 cm, with 1 growing points. *Stems* 4, erect, unbranched; internodes to 4.5 cm long, to 0.5 mm thick, wiry, pink to red, glabrous. *Stipules* late deciduous, lanceolate, 1–4.5 × 1–2 mm, apex acute, opaque, red to brown, glabrous, margin entire, aciliate. *Leaves* 2–4 per stem, alternate, basifixed; petiole 0.8–7 cm long, pink to red, glabrous; blade subsymmetric, ovate, to 6.5 × 3.5 cm, succulent, apex acute, base shallowly-cordate, basal lobes not overlapping, sinus to 4 mm deep, margin irregularly crenate, ciliate, upper surface copper to dark green, glabrous, lower surface red, glabrous, veins palmate-pinnate, 5–7 veined from the base, 2–3 veins on the larger side, 2–3 veins on the smaller side. *Inflorescences* 1–3, bisexual, axillary, erect, cymose, with up to 4 branches, bearing up to 4 staminate flowers and 4 pistillate flowers, protandrous; peduncle to 5.5 cm long, green to red, glabrous, bracts persistent, elliptic to lanceolate, 2–4 × 1–1.5 mm, translucent, pale green, glabrous, apex obtuse, margin entire, glabrous. *Staminate flowers*: pedicels to 15 mm long, glabrous; tepals 4, spreading, outer 2 elliptic to obovate, 6–7 × 3–4 mm, apex obtuse, white, glabrous, margin entire, aciliate, inner 2 elliptic to oblanceolate, 4–6 × 2.5–3 mm, apex acute to obtuse, white, glabrous, margin entire, aciliate; stamens 15–20, spreading, yellow, filaments 1–3 mm long, fused into a 0.5 mm column, anthers cuboid, 0.5 × 0.5–0.75 mm long, dehiscing via lateral slits, connectives extended 0.1 mm, symmetrically basifixed. *Pistillate flowers*: pedicels to 20 mm long; bracteoles 2, positioned directly beneath the ovary, elliptic to lanceolate, 2–4 × 1–1.5 mm, apex obtuse, translucent, pale green, glabrous, margin entire, aciliate; tepals 5, subequal, persistent in fruit, spreading, the ovate to obovate, 3.5–6 × 3.5–5 mm, apex obtuse to rounded, white, glabrous, margin entire, aciliate; ovary body cuboid, 3.5–6 × 3.6–6 mm, pale green, glabrous, equally 3-winged, wings marginal, 0.5–1 × 3.5–6 mm; 2- or 3-locular, placentae branches entire, bearing ovules on both surfaces; styles 2 or 3, yellow, free to base, 2–3 mm long, 2-lobed, stigmatic papillae in a spiral band. *Fruiting pedicel* to 25 mm long. *Fruit body* globose, to 6 × 6 mm, drying brown, wings same shape as in ovary, expanding to 2.5 mm wide.

**Proposed conservation assessment**

Assessed by Moonlight & Tebbitt (2016) as Vulnerable (VU D2), based upon its AOO of < 8 km$^2$. A further population has been identified 50 km to the SW of the type locality and one further collection has been made at the type locality (*P.W. Moonlight 1261*), where the population appeared stable. The AOO of the species is now 12 km$^2$ and remains within the criteria required for an assessment as Vulnerable (VU D2).

**Identification notes**

The only tuberous species of *Begonia* in northern Peru with subsymmetric, ovate leaves. It is also unusual among tuberous Peruvian begonias in its crenate leaf margins and stamens held on a short column.

**Distribution and ecology**

Endemic to Peru and Rioja Province, San Martín Region (Fig. 90B). Found in lower montane forest at an elevation of 1300–1800 m a.s.l. where it grows directly on limestone in the shade of montane forest and with its tuber buried in alkaline soil. *Begonia speculum* Moonlight & Tebbitt has been collected from two populations in Bosque de Protección Alto Mayo and identified from photographs taken by Wenbo Chen of a third population ca 7.5 km ESE of Nuevo Cajamarca (5°58′17″ S, 77°21′57″ W;

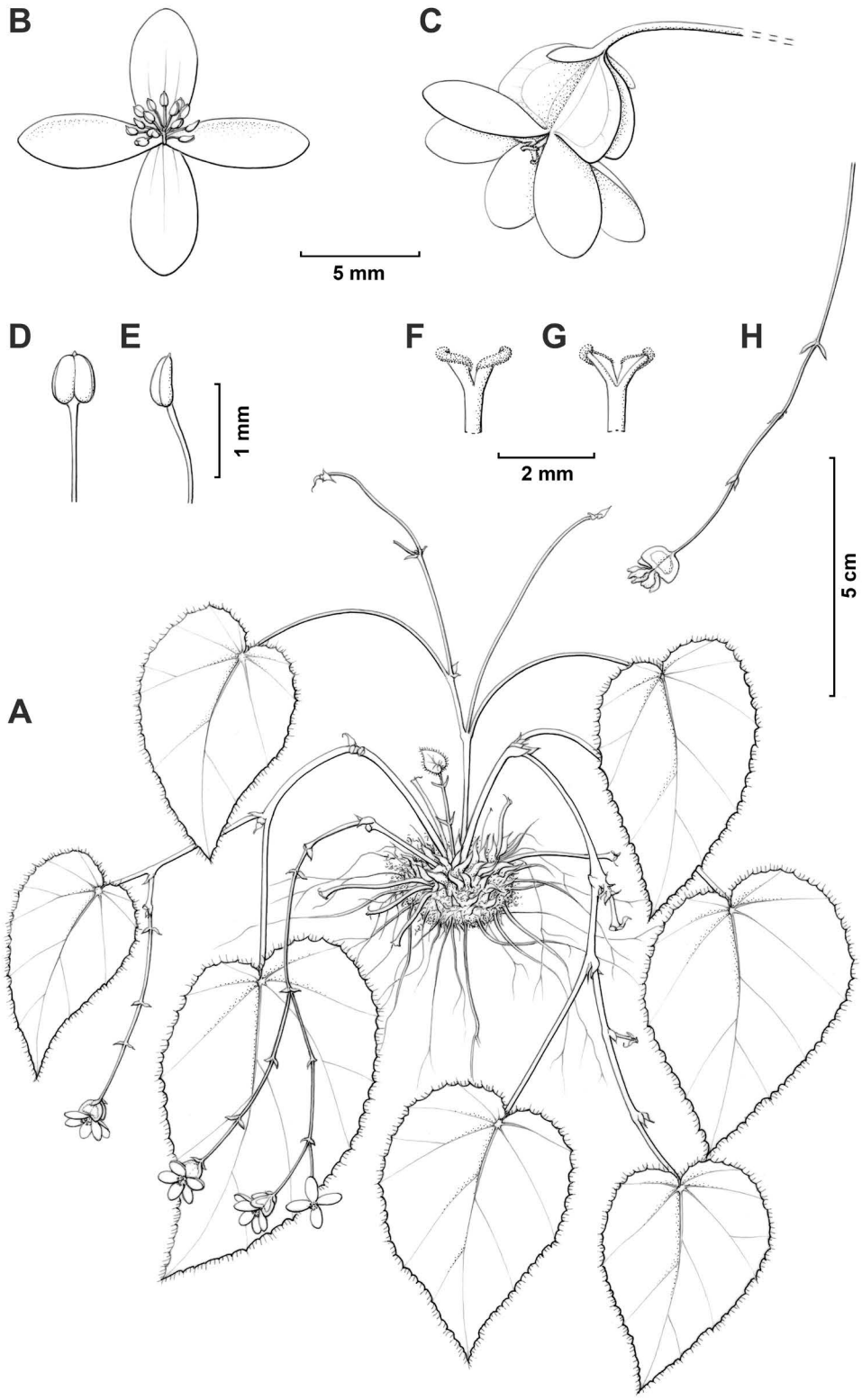


**Fig. 93.** *Begonia speculum* Moonlight & Tebbitt. **A**. Habit. **B**. Staminate flower, front view. **C**. Pistillate flower, side view. **D**. Stamen, front view. **E**. Stamen, side view. **F**. Pistil, front view. **G**. Pistil, back view. **H**. Infructescence. Illustration by Claire Banks from *P.W. Moonlight & A. Daza 158* (E). Reproduced from Moonlight & Tebbitt (2016), with the permission of *Edinburgh Journal of Botany*.

[1300 m a.s.l.]). As a tuberous herb, *B. speculum* presumably has a dormant period but it has been collected in flower and fruit in February and July, so it remains unclear when this is.

### 75. ***Begonia thyrsoidea*** Irmsch.
Figs 90B, 94

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 610 (Irmscher 1949). – **Type**: PERU – **Cusco Region: Prov. Calca** • Lares Valley between Calca and Pasto Grande; [12°46′ S, 72°09′ W]; 1400–1500 m a.s.l.; 11 Mar. 1929; *A. Weberbauer 7927*; lectotype: B [B100186590], designated by Moonlight & Tebbitt (2016: 119); isolectotypes: B [B100186591], BM [BM000926667], F [V0042331F], GH [GH00068288], NY [NY01085846], U [U0139626], US [US00115468].

Brako & Zarucchi (1993: 195); León & Monsalve (2006: 169); Moonlight & Tebbitt (2016: 119).

#### Etymology

Named for the resemblance of the unusual androecium of the species to a thyrsus, a wand or staff from ancient Greek mythology.

#### Specimens examined

PERU – **Puno Region: Prov. Carabaya** • Dist. San Gabán, between Ollachea and San Gabán, km 259+200, below the hydroelectric substation San Gabán II; 13°38′ S, 70°27′ W; 1450–1555 m a.s.l.; 9 Jan. 2015; *M.C. Tebbitt & A. Daza 809*; E [E01059318], MOL.

#### Description

Caulescent, tuberous herb, to 15 cm high. *Tuber* ellipsoid to sub-globose, 1–3 × 0.5–1 cm, with 1 growing point. *Stems* 1–5, erect, unbranched or few-branched; internodes to 7.5 cm long, to 1 mm thick, wiry, pale red, glabrous to sparsely tomentose. *Stipules* persistent, ovate to lanceolate, 1–3 × 0.5–1 mm, apex acute, aristate, translucent, pale green, glabrous, margin irregularly-lacerate, ciliate. *Leaves* 3–7 per stem, alternate, basifixed; petiole 0.5–4.5 cm long, pale red, glabrous to sparsely tomentose; blade asymmetrical, broadly lanceolate to ovate, to 7 × 7 cm, succulent, apex acute, base truncate to cordate, basal lobes not overlapping, sinus to 18 mm deep, margin crenate-lobed, the lobes dentate, ciliate, upper surface dark green, sparsely to moderately pilose, lower surface pale green flushed purple, sparsely pilose to densely pilose on the veins, veins palmate-pinnate, 6–9 veined from the base, with 2–4 secondary veins on the larger side, 1–3 secondary veins on the smaller side. *Inflorescences* 1–6 per stem, bisexual, axillary, erect, an asymmetrical cyme, with 2–3 branches, bearing up to 2 staminate flowers and 1 pistillate flower, protandrous; peduncle to 7.5 cm long, pale red, glabrous to sparsely pubescent, bracts persistent, oblong to narrowly ovate, 2–4 × 1–2 mm, translucent, pale green, glabrous, apex acute, margin irregularly-lacerate, ciliate. *Staminate flowers*: pedicels to 20 mm long, glabrous; tepals 4, spreading, outer 2 ovate, 4–9 × 3–4 mm, apex rounded, white, tinged red outside, glabrous, margin entire, aciliate, inner 2 elliptic to oblong, 3–7 × 2.5–4 mm, apex obtuse, white, glabrous, margin entire, aciliate; stamens 15–20, projecting, yellow, filaments 0.5–1.5 mm long, fused into a 2–2.75 mm long column, anthers cuboid, ca 0.75 × 0.5 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 17 mm long; bracteoles absent; tepals 5, subequal, deciduous in fruit, spreading, narrowly elliptic to obovate, 4–5.5 × 1.5–3 mm, apex obtuse, white tinged red outside, glabrous, margin entire, aciliate; ovary body ellipsoid to obovoid, 2–4 × 3–5 mm, green tinged purple, glabrous, unequally 3-winged, wings triangular, largest 2–5 × 2–2.5 mm, smallest 3–5 × ca 0.5 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, fused at the base, 2.5–3.5 mm long, once-divided, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to

1.7 mm long. *Fruit body* ovoid, to 7 × 4 mm, drying brown, wings same shape as in ovary, the largest expanding to 9 × 7 mm, the smallest expanding to 8 × 3 mm.

**Proposed conservation assessment**

Assessed by León & Monsalve (2006) and Moonlight & Tebbitt (2016) as Data Deficient (DD). The latter authors noted that they were unable to locate the species at its type locality during fieldwork in either 2014 or 2015, and that the area has undergone widespread deforestation. We consider it appropriate to reassess *B. thyrsoidea* as Endangered (EN B1ab(iii)).

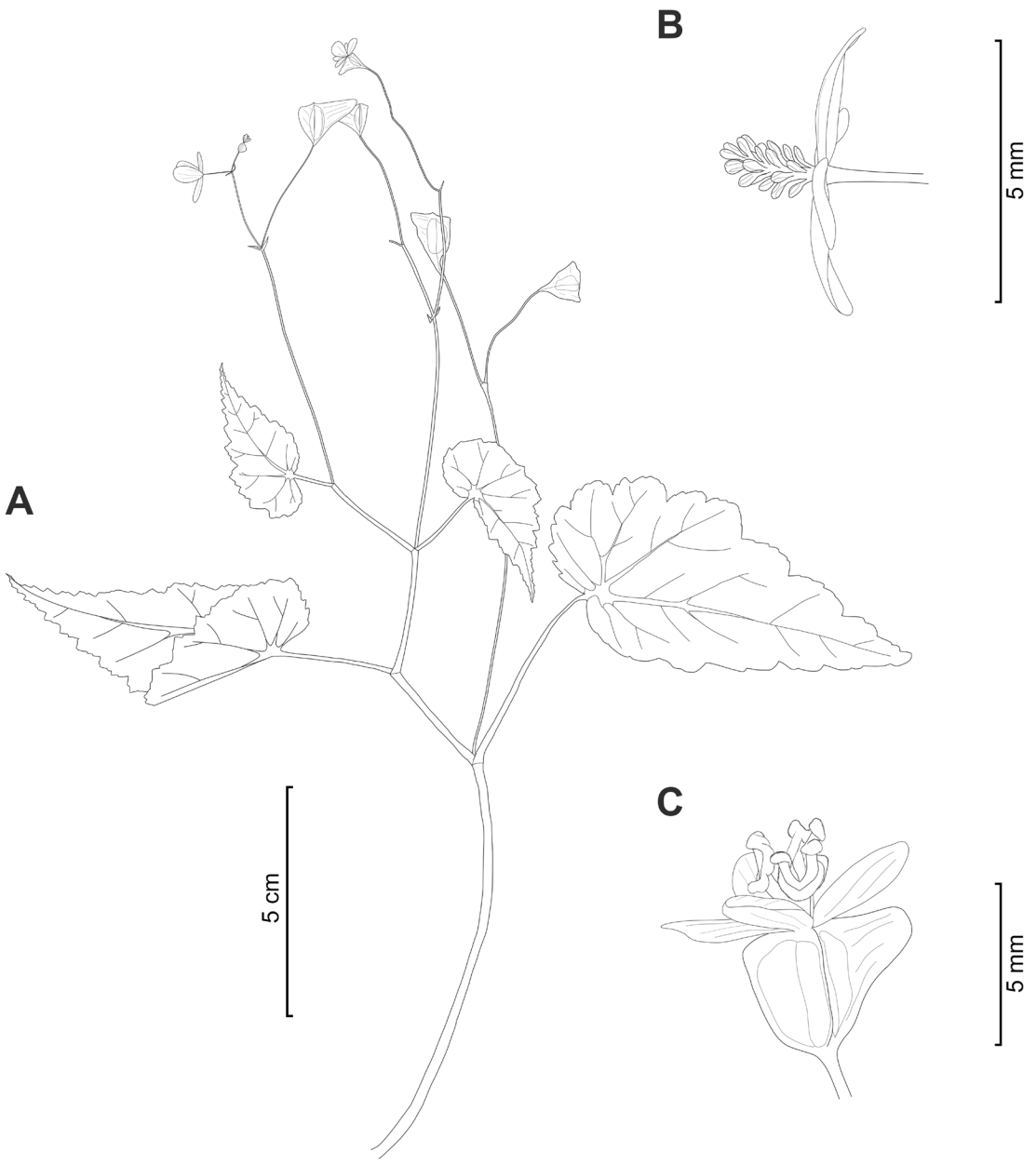


**Fig. 94.** *Begonia thyrsoidea* Irmsch. **A**. Habit. **B**. Staminate flower, side view. **C**. Pistillate flower, side view. Illustration by Peter Moonlight from photographs of *M.C. Tebbitt & A. Daza 809* (E).

### Identification notes

Unique among small tuberous begonias in Peru in its staminate flowers with its anthers united into a > 2 mm long column. It is also unusual in its asymmetrical inflorescences, which are only found amongst tuberous Peruvian begonias in members of the octopetala group of *B.* sect. *Eupetalum* with many more tepals on both the staminate and pistillate flowers.

### Distribution and ecology

Endemic to Peru and known from Cuzco and Puno Regions (Fig. 90A). Found in lower montane forests at 1400–1555 m a.s.l. on moist, shaded cliffs. As a tuberous herb, *B. thyrsoidea* presumably dies back to its tuber in the dry season and flowers in the wet season (January to March).

## 76. ***Begonia urubambensis*** Tebbitt

Figs 90B, 95

*Edinburgh Journal of Botany* 73 (1): 14 (Tebbitt 2016). – **Type**: PERU – **Cusco Region: Prov. La Convención** • Dist. Echarate, Kiteni y alrededores del margen izquierda del río Alto Urubamba; 12°47′ S, 72°40′ W; 667 m a.s.l.; 2 Feb. 1989; *P. Núñez & J. Arque 10092*; holotype: CUZ; isotypes: MO [MO-1835948], US [US00672877].

### Etymology

When it was described, *B. urubambensis* was known from a single population surrounding the upper río Urubamba. It is named for its type locality.

### Specimens examined

PERU – **Ucayali Region: Prov. Atalaya** • km 60 of road from Puerto Ocopa to Atalaya; 10°54′10″ S, 74°08′19″ W; 718 m a.s.l.; 14 Feb. 2016; *P.W. Moonlight & A. Daza 244*; E [E00885555], G, MO [MO-3254778], MOL • ibid., km 89; 10°54′08″ S, 74°04′16″ W; 650 m a.s.l.; 14 Feb. 2016; *P.W. Moonlight & A. Daza 246*; E [E00885559], MO [MO-3254804], MOL • ibid., km 97; 10°53′52″ S, 74°00′57″ W; 598 m a.s.l.; 15 Feb. 2016; *P.M. Moonlight & A. Daza 253*; E [E00885558], MO [MO-3254782], MOL. – **Cusco Region: Prov. La Convención** • Dist. Echarate, roadside from 3–4 km south of Palma Real to Kiteni; 12°36′ S, 72°42′ W; 710 m a.s.l.; 6 Jan. 2015; *M.C. Tebbitt & A. Daza 800*[a]; E [E01059295], MOL, USM • río Manguriari (Manguyari), alto Urubamba, río Manguriari; 12°47′ S, 72°40′ W; 750 m a.s.l.; 2 Feb. 1991; *P. Núñez & G. Ortíz 12802*; USM • Dist. Echarate, San Antonio; 12°39′18″ S, 72°55′09″ W; 1310 m a.s.l.; *L. Valenzuela 6652*; MO [MO-2981119], US [US00951222], USM • Dist. Echarate, Palma Real; 12°56′31″ S, 72°46’58′ W; 850 m a.s.l.; *I. Huamantupa 807*; E [E01007283].

### Description

Acaulescent, rhizomatous herb, to 50 cm high. *Rhizome* ellipsoid, 1–8 × 1.5–2 cm, with 1 growing point. *Stipules* deciduous, narrowly-lanceolate to lanceolate, 3–5 × 1.5–2 mm, apex acute, translucent, white to pink, glabrous, margin entire, aciliate. *Leaves* 2–5, alternate, peltate; petiole 10–52 cm long, pale green, glabrous; blade subsymmetric, ovate-orbicular, to 25 × 23 cm, succulent, apex acuminate, base rounded, margin minutely-crenate, ciliate, upper surface mid-green, sparsely pilose, lower surface pale green, glabrous to sparsely pilose and densely pilose on the veins, veins peltate, 7–9 veined from the base. *Inflorescences* 1–2, bisexual, axillary, erect, an asymmetrical cyme, with up to 4 branches, bearing up to 15 staminate flowers and 10 pistillate flowers, protandrous; peduncle to 45 cm long, pale green, sparsely pubescent, bracts deciduous, elliptic to ovate, 5–12 × 2–6 mm, translucent, white to pink, glabrous, apex acute and short-apiculate, margin entire, aciliate. *Staminate flowers*: pedicels to 15 mm long,

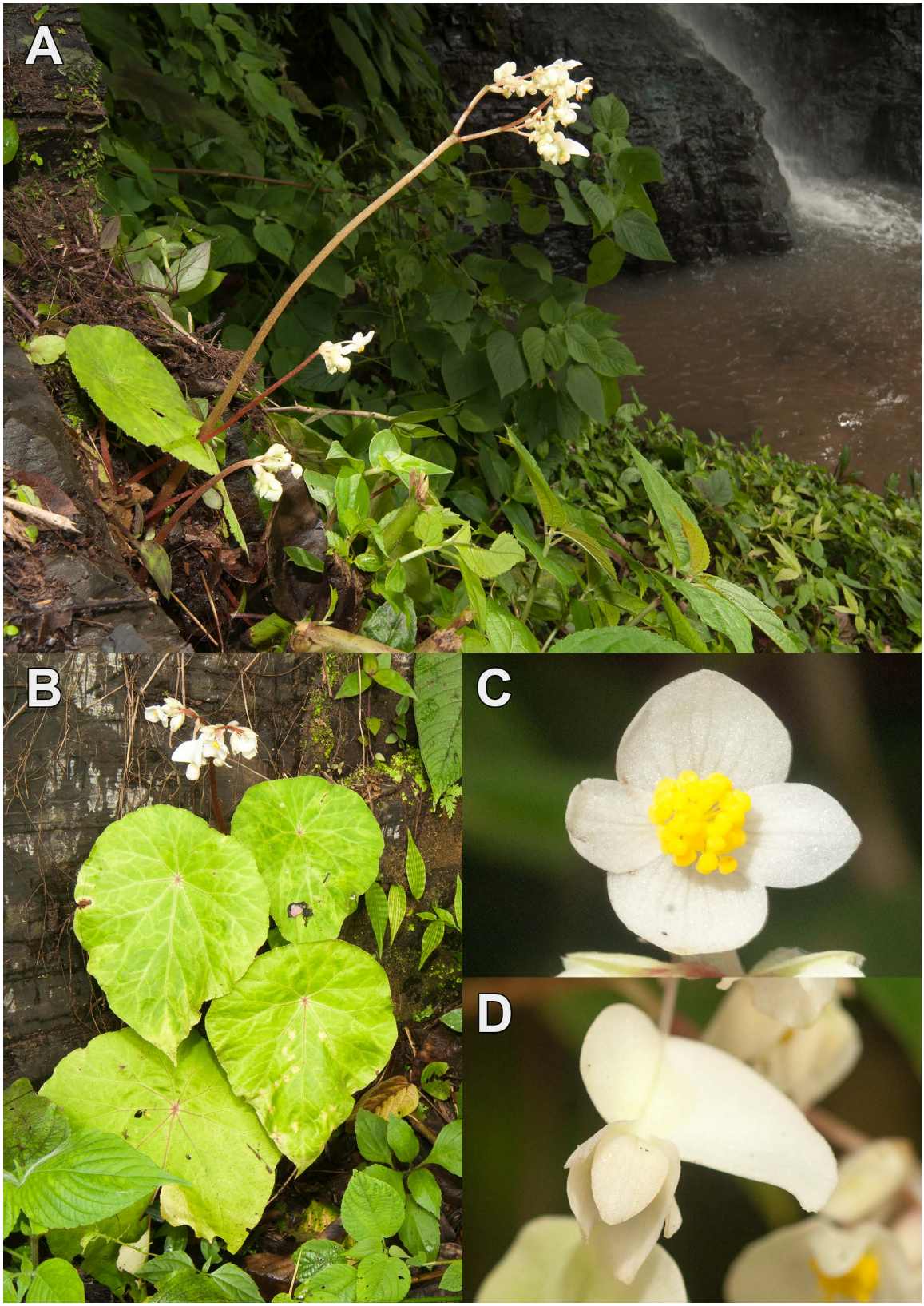


**Fig. 95.** *Begonia urubambensis* Tebbitt. **A**. Habitat. **B**. Habit. **C**. Staminate flower, front view. **D**. Pistillate flower, side view. All photographs by P.W. Moonlight from *P.W. Moonlight & A. Daza 246* in Atalaya Province, Ucayali Region.

glabrous; tepals 4, spreading, outer 2 broadly-ovate or broadly-elliptic, 7–13 × 5–11 mm, apex obtuse to rounded, white, glabrous, margin entire, aciliate, inner 2 elliptic, 5–13 × 2.5–5.5 mm, apex obtuse, white, glabrous, margin entire, aciliate; stamens 35–50, spreading, yellow, filaments 1.5–3 mm long, free, anthers globose, 0.5–0.75 × 0.5–0.75 mm, dehiscing via lateral slits, connectives not extended, symmetrically basifixed. *Pistillate flowers*: pedicels to 25 mm long; bracteoles lacking; tepals 5, subequal, persistent in fruit, spreading, elliptic to ovate, 4–10 × 2–4.5 mm, apex obtuse, white, glabrous, margin entire, aciliate; ovary body ellipsoid, 4–7 × 3–5 mm, white, glabrous, unequally 3-winged, wings triangular, largest 5–9 × 5–10 mm, smallest ca 4–7 × 2–4 mm; 3-locular, placentae branches divided, bearing ovules on both surfaces; styles 3, yellow, free, 3–4 mm long, once-divided, stigmatic papillae in a spirally-twisted band. *Fruiting pedicel* to 35 mm long. *Fruit* a capsule, body ellipsoid to spheroid, to 10 × 8.5 mm, drying brown, wings same shape as in ovary, the largest expanding to 15 × 20 mm, the smallest expanding to 10 × 8 mm.

**Proposed conservation assessment**

Assessed by Tebbitt (2016) as Vulnerable (VU D2) based upon the species' single known locality and pressures from land use change. Since then, we have collected the species from an additional population along the road to Atalaya, Ucayali Region. The species is highly abundant along a 15 km stretch of road, and the population appeared stable in 2016. We assess the species as Vulnerable (VU B1ab(iii)) due to its EOO of < 10 000 km$^2$, two known localities, and the pressures of land use change at the type locality.

**Identification notes**

*Begonia urubambensis* is one of three terrestrial species of Peruvian *Begonia* with large (> 15 × 10 cm), peltate leaves. The other two species are *B. acerifolia* and *B. serotina*. It can be distinguished from both of these species because it lacks an aerial stem and also because its inflorescence is an asymmetrical cyme. It can also be distinguished from *B. acerifolia* because its leaves lack lobes (the leaves of *B. acerifolia* always have at least three triangular lobes).

**Distribution and ecology**

Endemic to Peru and known from Cuzco and Ucayali Regions (Fig. 89B). Found in semi-deciduous and Amazonian forest and at an elevation of 598–1310 m a.s.l. *Begonia urubambensis* has been collected on humid, shaded roadside or riverside banks. The species is rhizomatous and may die back to its rhizomes in the dry season.

## *Excluded names*

***Begonia anemonoides*** Haenke

*Voyages dans l'Amérique Méridionale depuis 1781-1801* 2: 503 (Haenke 1809). – **Type**: unknown.

**Notes**

This species was described as abundant in the Andes Mountains of "Peruvia". At the turn of the 19th Century "Peruvia" referred to the Viceroyalty of Peru including much of modern-day Ecuador, Peru, Bolivia and Chile. It remains very unclear where Haenke encountered this species. Furthermore, no type material of the species was cited in the protologue, but it is possible that some original material remains undiscovered among the specimens housed in PR herbarium. The protologue describes the species as tuberous with flowers resembling those of an *Anemone*, and while this is not sufficient for identification it seems likely that this refers to a member of the octopetala group of *B.* sect. *Eupetalum* (Tebbitt 2015). The only member of the octopetala group described before 1809 was *B. octopetala* so *B. anemonoides* Haenke may be an earlier name for any other species in this group. The discovery of original material

and lectotypification of *B. anemonoides* should be a priority for any future work on Peruvian or tuberous Andean *Begonia*, and if this is not possible the name should be rejected.

### ***Begonia botryoides*** Moonlight & Tebbitt

*Edinburgh Journal of Botany* 74(2): 201 (Tebbitt *et al.* 2017). – **Type**: ECUADOR – **Prov. El Oro** • Road Piñas-Santa Rosa, above El Placer; [3°38′ S, 79°45′ W]; 800–1000 m a.s.l.; 15 Oct. 1977; *G. Harling, U. Eliasson & L. Andersson 15551*; holotype: GB; isotypes: MO [MO-2271396], US [US00221535], S.

*Begonia albomaculata* auct. non. C.DC.: L.B.Sm. & B.G.Schub., *Memoirs of the New York Botanical Garden* 8 (1): 37 (Smith & Schubert 1952).

*Begonia albomaculata* auct. non. C.DC.: L.B.Sm. & Wassh., *Phytologia* 44 (4): 246 (Smith & Wasshausen 1979).

Smith & Wasshausen (1984: 465, pl. 1, 1985: 46).

**Notes**

*Begonia albomaculata* is a Peruvian species covered in this account. During the period Lyman Bradford Smith and his colleagues were working on Andean Begonia, the type of this species was unknown. As discussed in detail in Tebbitt *et al.* (2017), a photograph of an Ecuadorian specimen, Camp E-618 (G) housed at F, was used as a de facto type. This specimen was erroneously identified by C.DC. as *B. albomaculata* but in fact represents a distantly related species, which was described in Tebbitt *et al.* (2017) as *B. botryoides* Moonlight & Tebbitt and is not found in Peru.

### ***Begonia boissieri*** A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 126 (de Candolle 1859). – **Type**: MEXICO • *J.A. Pavón s.n.*; holotype: G ex G-BOIS [G00237515].

de Candolle (1864: 311); Smith & Schubert (1950: 241).

**Notes**

The author cited the type specimen in the protologue as "in Mexico?" (de Candolle 1859: 126) but in his 1864 account of the Begoniaceae (de Candolle 1864: 311) cited the same specimen as "In Mexico? Vel Peruviá". *Begonia boisseri* is endemic to Mexico, and there is no indication on the label of the type specimen that it was collected in Peru.

### ***Begonia cinnabarina*** Hook.

*Curtis's Botanical Magazine* 75: t. 4483 (Hooker 1849). – **Type**: lectotype: plate in Hook., *Curtis's Botanical Magazine* 75: t. 4883 (Hooker 1849), designated by Tebbitt *et al.* (2018b: 252).

Smith & Schubert (1944: 78).

**Notes**

*Begonia cinnabarina* Hook. is widely distributed in Bolivia with a few collections from northern Argentina (Tebbitt *et al.* 2018b). In their 1941 account for the Flora of Peru (Smith & Schubert 1941a), Lyman Bradford Smith and Bernice G. Schubert cite Peruvian material collected by *Clarke* as *B. cinnabarina.* We have not seen any material collected by anyone named Clarke from Peru but suspect any such material, if it exists, was collected in Bolivia.

### ***Begonia cucullata*** Willd.

*Species plantarum* 4: 414 (Willdenow 1805). – **Type**: BRAZIL • *coll. unknown s.n.*; holotype: B-W [17567, n.v.].

de Candolle (1864: 291); Smith & Schubert (1941a: 187, 1946b: 99); Golding (1982: 330); Brako & Zarucchi (1993: 191).

#### Specimens examined

PERU – **Lima Region: Prov. Lima** • Jul. 1922, *C.O. Ridoutt s.n.*; USM [2]. – **Cusco Region: Prov. Calca** • Amparaes, centre of the town; 3300–3400 m a.s.l.; *P. Núñez 6765*; MO [MO-1642974].

#### Notes

A widely distributed species with two large, disjunct populations. The first of these covers Brazil, Bolivia, Paraguay, and Argentina and the second covers much of Central America and northwest South America. *Begonia cucullata* Willd. is widely cultivated as an ornamental and is an important parent of the 'wax Begonia' group of cultivars. Lyman B. Smith and Bernice G. Schubert included *B. cucullata* in their 1941 account for the Flora of Peru (Smith & Schubert 1941a) based upon a single specimen from La Convención Province, Cusco Region (*Vargas 739*). We have not seen this specimen and the two specimens of *B. cucullata* we have seen were collected in the centre of large towns. *Begonia cucullata* does not appear to be widely naturalised in Peru, so we exclude it from this account.

### ***Begonia diversifolia*** var. ***nana*** Walp.

*Novorum Actorum Academiae Caesareae Leopoldino-Carolinae Naturae Curiosorum* 19 (suppl. 1): 408 (Walpers 1843b). – *Begonia hirtella* var. *nana* (Walp.) A.DC., *Flora Brasiliensis* 4 (1): 345 (de Candolle 1861). – **Type**: PERU • ad Altos de Toledo, *F.J.F. Meyen* [n.v., herbarium unknown].

de Candolle (1864: 299).

#### Notes

Walpers described *B. diversifolia* var. *nana* Walp. based upon a collection made by *F.J.F. Meyen* (Walpers 1843b: 409). Meyen's collection was made in Altos de Toledo, a pass between the cities of Puno and Arequipa (Weberbauer 1936). Almost without exception, the full length of all passes between these cities are above 4000 m in elevation and are dry, high elevation grasslands unsuitable for *Begonia* species. This is a variety of *B. diversifolia* Graham, which is a member of *B.* sect. *Quadriperigonia* Ziesenh. and only distantly related to any Peruvian *Begonia* species (Moonlight *et al.* 2018). The description provided by Walpers is insufficient to identify this specimen to any known Peruvian species. Alphonse Pyramus de Candolle moved this taxon to a variety of *B. hirtella* in his Flora of Brazil account and cited several Brazilian specimens of *B. hirtella* as the same variety (de Candolle 1861) and later repeated this citation (de Candolle 1864). It is unclear whether de Candolle saw the type of *B. diversifolia* var. *nana*. He also cited a specimen collected by Meyen in Rio de Janeiro, which is a syntype of Walper's *B. meyeniana* Walp. (a taxon of uncertain application; Jacques & Mamede 2005). It is possible de Candolle confused these specimens or also that Walpers confused the type locality of the two specimens. Walper's herbarium was sold upon his death and the location of his specimens are unknown. We have been unable to locate any specimens matching his description. Given the considerable uncertainty surrounding the type locality, protologue description, and classification of this species, we suggest that if the type specimen cannot be located that this name should be rejected.

***Begonia humilis*** var. ***porteriana*** (Fisch., C.A.Mey. & Avé-Lall.) A.DC.

*Flora Brasiliensis* 4 (1): 344 (de Candolle 1861). – *Begonia porteriana* Fisch., C.A.Mey. & Avé-Lall., *Index Seminum, quae Hortus Botanicus Imperialis Petropolitanus pro Mutua Commutatione Offert. Accedunt Animadversiones Botanicae Nonnullae* 8: 51 (Fischer *et al.* 1842). – **Type**: unknown.
Klotzsch (1855: 156); Walpers (1858: 881); de Candolle (1864: 298).

**Notes**

The protologue *B. porteriana* Fisch., C.A.Mey. & Avé-Lall. cites living material grown from seeds sent from Pará State, Brazil by Sir Robert Ker Porter (Fischer *et al.* 1842: 51), the Scottish botanist, diplomat, and historical painter to Tsar Alexander the 1st of Russia. Porter was British counsel to Venezuela for fifteen years from 1826 but we know of no evidence he travelled to Pará in Brazil, but this seems likely. Fischer's specimens are held in Saint Petersburg herbarium (LE) and there is a specimen in the de Candolle herbarium (G-DC) that was grown in Saint Petersburg by Fischer. This specimen is however labelled as "*Begonia humilis*" and might not have fallen under Fischer's concept of *B. porteriana*. We have not been able to undertake a full search of Saint Petersburg herbarium so cannot rule out the possibility of there being original material of this name present. Alphonse Pyramus de Candolle (1861: 344) treated *B. porteriana* as a variety of *B. humilis* (de Candolle 1861: 344). We treat this taxon as an excluded name.

***Begonia falcifolia*** Hook.f.

*Curtis's Botanical Magazine* 94: t. 5707 (Hooker 1868). – **Type**: hort. Kew; *coll. unknown s.n.*; holotype: K [K000739972].
Brako & Zarucchi (1993: 192); León & Monsalve (2006: 166).

**Notes**

This species was described from plants grown in the glasshouses of Kew Gardens, which J.D. Hooker stated in the protologue were collected in Peru by Pearce and given to Kew by Veitch Nurseries (Hooker 1868). The illustration and type specimen are however of a species closely allied to *B. malabarica* Lam., a species from southern India and Sri Lanka. Plant hunters from both Kew Gardens and Veitch Nurseries had collected in this area by this date, so it seems likely this is an Indian species whose providence was confused in either institution.

***Begonia fuchsiiflora*** (A.DC.) A.I.Baranov & F.A.Barkley

*Phytologia* 26 (4): 220 (Barkley & Baranov 1973). – *Casparya fuchsiiflora* A.DC., *Annales des Sciences Naturelles Botanique, Série 4* 11: 116 (de Candolle 1859). – **Type**: ECUADOR • Andium Quitensium; 2135 m a.s.l.; 1856, *W. Jameson 416*; lectotype: G-DC, designated by Smith & Wasshausen (1979: 243); isolectotypes: E [E00265149], K [K001089508], P [P01900748].
Brako & Zarucchi (1993: 192).

**Notes**

The name *B. fuchsiiflora* (A.DC.) A.I.Baranov & F.A.Barkley was included in the latest checklist of Peru by Brako & Zarucchi (1993). This species is not found in Peru and no specimens were cited.

### ***Begonia floribunda*** Carrière

*Revue Horticole* 47: 420 (Carrière 1875). – *Begonia fuchsioides* var. *floribunda* (Carrière) Irmsch., *Pareys Blumengartnerei, 2nd Edition*: 72 (Irmscher 1960). – **Type**: unknown.
Dorr (1999: 259).

#### Notes

The name *B. floribunda* Carrière is of unknown origin and of even less certain application. The first instance of this name we have found in the literature dates to 1844, when C. Roberts brought plants named as *B. floribunda* to the north Devon county show (Anonymous 1844). A later entry in *The Horticulturist* cites *B. floribunda* as alternative names for either *B. dregei* or *B. parvifolia*, which are very different species (Anonymous 1846: 379, 392). The name appears in several other horticultural journals in the decades before Carrière's name was published and was probably applied to at least two species or hybrids. Irrespective, Carrière's name does represent the first valid and legitimate description of a *Begonia* species by this name. It does not however include a type citation, a description sufficient for identifying the species, nor an illustration. We therefore suggest this name should be rejected. We include it in this account because Irmscher (1960) treated it as a variety of *B. fuchsioides* and it was treated as a synonym of *B. foliosa* by Dorr (1999).

### ***Begonia heracleifolia*** Schltdl. & Cham.

*Linnea* 5: 603 (Schlechtendal & Chamisso 1830). – *Gireoudia heracleifolia* (Schltdl. & Cham.) Klotzsch, *Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin* 1854: 125 (Klotzsch 1854). – **Type**: MEXICO • Hacienda de la Laguna, Baranca de Tioselo; 1828; *Schiede 729*; syntype: B [B100243034].
de Candolle (1864: 335); Brako & Zarucchi (1993: 193); Vásquez *et al.* (2005: 112–125).

#### Specimens examined

PERU – **Loreto Region** • Iquitos and vicinity, 120 m a.s.l.; Oct. 1929; *L. Williams 3550*; F • La Victoria on the Amazon river; Aug.–Sep. 1929; *L. Williams 3179*; F. – **Pasco Region: Prov. Oxapampa** • Dist. Oxapampa, A los alrededores de Oxapampa colecta de plantas ornamentals de diferentes jardines; 10°34′54″ S; 75°24′26″ W; 1800 m a.s.l.; *R. Rojas, E. Becerra, G. Castillo, L. Chuck, A. Peña & C. Rojas 4338*; HOXA.

#### Notes

This species is distributed from Honduras to Nayarit State in western Mexico but widely cultivated beyond its natural range, including in Peru. All the specimens we have seen from Peru are from settlements and *B. heracleifolia* Schltdl. & Cham. does not seem to be widely naturalised.

### ***Begonia marinae*** Tebbitt.

*Novon* 23 (4): 481, fig. 1 (Tebbitt 2015). – **Type**: BOLIVIA – **Dept. Santa Cruz: Prov. Vallegrande** • Rd. from Pucará to Alto Seco, N & NE facing open slopes in remnant Tucomano forest; 18°44′ S, 64°06′ W; 2727 m a.s.l.; 12 Jan. 2012; *M.C. Tebbitt 724*; holotype: UCZ; isotype: UCZ [2].
*Begonia octopetala* auct. non L'Hér.: Griseb., *Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen* 19: 148 (Grisebach 1874).

#### Notes

Bolivian specimens of this species were identified as *B. octopetala* by Grisebach (1874). Some of these specimens were mistakenly cited as from Peru.

### ***Begonia maurandiae*** A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 119 (de Candolle 1859). – **Type**: COLOMBIA • 1842; *J.J. Linden 1121*; syntypes: K, G, G-BOIS, GENT [GENT10167199], OXF, P [P05494676] • ad Quindio, *J.J. Triana 3038*; syntype: K [n.v.] • Antioquia; *G.J.D. Servais s.n.*; syntype: K. – ECUADOR • near Lloa; *W. Jameson 36*; syntype: K [K000536695].

de Candolle (1864: 279); Smith & Schubert (1946b: 78, 1952: 39); Smith & Wasshausen (1986: 94).

#### Typification notes

Smith & Schubert (1946b: 96) cited a duplicate of *J.J. Triana 3038* held in Kew as the type of *Begonia maurandiae* A.DC. This was not correct as this gathering was not cited in the protologue (de Candolle 1859: 119). We are not aware of any legitimate attempts to lectotypify this name.

#### Notes

In his account of the Begoniaceae, de Candolle (1864: 279) cited the locality of the syntype *W. Jameson 36* (K) as "in Peruviá prope Lloa". This locality is in Ecuador, and the species is known only from Colombia and Ecuador.

### ***Begonia patula*** Haw.

*Supplementum Plantarum* Succulentarum: 100 (Haworth 1819). – **Type**: unknown.

Otto & Dietrich (1836: 358); Klotzsch (1855: 150); Walpers (1843a: 215, 1858: 879); de Candolle (1861: 348, 1864 : 302); Smith & Schubert (1950: 245); Smith & Smith (1971: 49); Jacques & Mamede (2005: 581).

#### Notes

This name was published by Haworth based upon plants cultivated in Loddiges' nursery in Hackney in 1816 (Haworth 1819: 100). The plants had arrived at Loddiges' from Mr Gulielmo Anderson, who had in turn received them from Mr C.F. Otto in 1811, the inspector of Berlin Botanical Gardens. The description in the protologue is insufficient for identification and there is no illustration. Most of Haworth's specimens are deposited in Kew and Oxford herbaria, but we have found no material labelled with this name that predates the publication of the protologue so could be considered type material. It is possible that there is original material among the cultivated material in Kew or Berlin herbarium. We however consider it extremely unlikely that it will ever be possible to determine to which species this name belongs and follow Jacques & Mamede (2005) in suggesting the name is rejected.

We cite *B. patula* Haw. here because it has frequently been considered the same species as *B. fischeri* and was published earlier. The first suggestion of this derives from the protologue of *B. pauciflora* (Lindley 1820: t. 471), which is now considered a synonym of *B. fischeri*. Lindley considered *B. patula* Haw. a probable synonym of *B. pauciflora*, contrary to the principle of priority. Haworth (1821b: cc) later published an addendum in Edward's Botanical Register, which stated that *B. pauciflora* and *B. patula* Haw. were different species. Later authors including Walpers (1843a: 215), Klotzsch (1855: 150), and Smith & Schubert (1950: 245) disregarded this and considered *B. patula* Haw. an earlier name for *B. pauciflora*. Alphonse de Candolle (1861: 348; 1864: 302) further confused matters by citing Klotzsch's 1855 citation of *B. patula* Haw. as '*Begonia patula* Klotzsch', excluding *B. paucifolia* from the citation and only doubtfully including *B. patula* Haw. in synonymy. Smith & Wasshausen (1979) were the first to recognise that *B. patula* Haw. may not be the same species as *B. pauciflora*, and also the first to cite *B. fischeri* as the same species as *B. pauciflora*. In the synonymy of *B. fischeri*, they cited '*Begonia patula* sensu Klotzsch non Haw.'

### ***Begonia rubricaulis*** Hook.

*Curtis's Botanical Magazine* 70: t. 4131 (Hooker 1844). – *Huszia rubricaulis* (Hook.) Klotzsch, *Gattungen und Arten* 1854: 139 (Klotzsch 1855). – **Type**: unknown.
de Candolle (1864: 283); Smith & Schubert (1941b: 85).

#### Notes

The protologue for this species states that the country of origin for this species is unknown (Hooker 1844), but it was cited by de Candolle (1864: 283) as Peruvian. *Begonia rubricaulis* Hook. is endemic to Argentina (Tebbitt 2015).

### ***Begonia tetrandra*** Irmsch,

*Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74 (4): 626 (Irmscher 1949). – **Type**: ECUADOR – **Prov. Tunguahara** • Valley of the Pastaza River, between Baños and Cashurco, 8 hours east of Baños; 1300–1800 m a.s.l.; 25 Sep. 1923; *A.S. Hitchcock 21889*; syntype: US [US00221970]). – PERU • *Lobb s.n.*; syntype: W [n.v.].
Brako & Zarucchi (1993: 195).

#### Notes

Brako & Zarucchi (1993) included *B. tetrandra* Irmsch. in the latest checklist of Peruvian *Begonia* based upon *Lobb s.n.* (W), a syntype of the name. We have not seen this specimen so, following Smith & Wasshausen (1986), treat the species as endemic to Ecuador and exclude the name from our treatment.

### ***Begonia weddelliana*** A.DC.

*Annales des Sciences Naturelles Botanique, Série 4* 11: 122 (de Candolle 1859). – **Type**: BOLIVIA – **[Dept. La Paz]: Prov. Yungas** • Dec. 1846; *H.A. Weddell 4294*; lectotype: P [P00482210], **designated here**; isolectotype: G-DC ex P.
de Candolle: 286, (1864); Smith & Schubert (1944: 76); Tebbitt (2013: 145).
*Begonia davisii* Hook.f., *Curtis's Botanical Magazine* 102: t. 6252 (Hooker 1876). – **Type**: lectotype: plate in Hook.f., *Curtis's Botanical Magazine* 102: t. 6252 (Hooker 1876), designated by Tebbitt (2013: 145); epitype: hort Kew ex hort Veitch; Aug. 1919; *coll. unknown s.n.*; K [K000252033], designated by Tebbitt (2013: 145).
Smith & Schubert (1941a: 188, 1944: 76); Brako & Zarucchi (1993: 191).

#### Typification notes

To clear up confusion surrounding the typification of *B. weddelliana*, we designated a lectotype for this name. The species was described with no herbarium cited for the type collection, but Tebbitt (2013) stated that a holotype was found in G-DC with an isotype in P. This is incorrect according to the nomenclatural code (Turland *et al.* 2018) as when no herbarium is cited all duplicates are syntypes (McNeill 2014). The duplicate in P includes six, more or less complete plants whereas the duplicate in G-DC contains only a single leaf removed by de Candolle from the duplicate in Paris. Accordingly, we designate the P duplicate as the lectotype.

#### Notes

*Begonia davisii* Hook.f. was described from living plants collected by J. Veitch near Chupe at ca 10 000 ft, and this locality was stated as being in Peru (de Candolle 1859: 122). In fact, Chupe is in La Paz Department, Bolivia and *B. weddelliana* A.DC., of which *B. davisii* is a synonym, is endemic to Bolivia (Tebbitt 2013).

### *Excluded specimen*

PERU – **Pasco Region: Prov. Oxapampa** • Camino to mirador from Pozuzuo; 10°03′59″ S, 75°32′37″ W; 792 m a.s.l.; 20 Feb. 2016; *P.W. Moonlight & A. Daza. 276*; E [E00885898], MO.

This specimen represents a small population of natural hybrids between *B. arrogans* and *B. chemillenensis*. Both species were present at this locality (see *P.W. Moonlight & A. Daza 274* and *278* respectively) but on different substrates. *Begonia chemillenensis* was collected growing on limestone rich rocks while *B. arrogans* grew on loam-rich rainforest soil. The hybrid population included perhaps 20 individuals growing on a mix of lime and loam rich soil at the base of a rock outcrop. The two parent individuals were both flowering and fruiting, but the hybrid population was sterile, which suggests it may be an infertile hybrid.

### *Rejected names*

*Begonia fischeri* var. *eufischeri* Irmsch., (nom. inval.), *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 76: 98 (Irmscher 1953).

Irmscher (1953: 98) published the name *B. fischeri* var. *eufischeri* Irmsch., indicating that it should be considered a new variety. Varieties beginning with the suffix *eu-* are not validly published (Turland *et al.* 2018: Article 24.3).

*Begonia roezlii* var. *rosea* Regel (nom. inval.; nom. nud.), *Gartenflora* 34: 21 (von Regel 1885).

In 1885, Eduard August von Regel published the name *B. roezlii* var. *rosea* Regel. This taxon is described as an 'originated by chance' by Mr Lynch of Colchester from parents of *B. roezlii* Regel. The offspring are described as 'a pretty variety with pink-red blooms' [translated from German]. We consider Regel's description insufficient for the valid publication of his variety as it refers to solely aesthetic features of the plant (Turland *et al.* 2018: Article 38.3). Prior to 1908, an illustration with analysis was also sufficient to act as a description (Turland *et al.* 2018: Article 38.8). The protologue of *B. roezlii* var. *rosea* includes an illustration but does not include analysis, which is defined as 'a figure or group of figures, commonly separate from the main illustration of the organism (though usually on the same page or plate), showing details aiding identification, with or without a separate caption' (Turland *et al.* 2018: Article 38.9). We consider *B. roezlii* var. *rosea* a nom. nud. without description.

*Begonia subciliata* var. *eusubciliata* Irmsch. (nom. inval.), *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 74: 587 (Irmscher 1949).

Irmscher (1949: 587) published the name *B. subciliata* var. *eusubciliata* Irmsch., indicating that it should be considered as a new variety. Varieties beginning with the prefix *eu-* are not validly published (Turland *et al.* 2018: Article 24.3).

## Discussion

### Previous treatments of Peruvian begonias

This treatment represents a significant advance on the previous floristic treatment of the Begoniaceae in Peru by Smith & Schubert (1941a). While both Smith & Schubert worked on Latin American begonias for several decades and produced high quality floristic accounts (e.g., Smith & Wasshausen 1986), their Flora of Peru account represented their first publication on *Begonia*. Smith & Schubert were severely limited by the scarcity of collections, an inability to visit European herbaria, and their lack of field experience of Andean begonias during the preparation of their account, so, in common with their account of Bolivian *Begonia* (Smith & Schubert 1944), made several unfortunate taxonomic errors (see

Moonlight & Fuentes 2022). We will not repeat these here but note that our account covers more than double the number of species covered by Smith & Schubert (76 vs 38) and that we cite more than fifteen times the number of collections (> 2000 vs < 120). Our account is also the first comprehensive floristic account of Peruvian *Begonia* where the authors have seen any of the species covered growing wild in Peru.

## The data void in Peruvian begonias

### Species distributions

Most tropical plant species are known from < 5 independent records in globally accessible, digitally available datasets (Feeley & Silman 2010). Following this treatment of Peruvian *Begonia*, only 28 species (37%) are represented by < 5 collections in Peru, but six of these are known from > 5 collections across their global range, leaving only 22 (29%) known from < 5 across their global range. This suggests that Peruvian *Begonia* are now a relatively well-known group, but we suspect that this is not because they are relatively well-collected. It is more likely that the focus on the taxonomy of Peruvian *Begonia* is the cause. There has been a focus on visiting herbaria, including their specimens in the *Begonia* Resource Centre (Hughes *et al.* 2015–ongoing), and identifying those specimens. Secondly, there has been a focus on collecting Peruvian begonias, particularly poorly known species. Third, the taxonomy of Peruvian *Begonia* is now relatively resolved including the synonymy, so the number of specimens for accepted species is not falsely reduced by assigning some of their specimens to synonyms. Of these factors, we suggest that the focus on including data from a diverse set of herbaria is most important, and particularly incorporating specimen data from Peruvian herbaria. Forty percent of the specimens we cite are held within Peruvian herbaria, which are not databased and available in online repositories (Delves et al., unpubl. data). The data void in tropical plant collections is a huge issue affecting biodiversity science, including taxonomy, and a focus on herbaria within megadiverse countries is likely to result in a significant reduction in its size.

While most Peruvian *Begonia* species are known from > 5 collections, there remain large gaps in our knowledge of their distributions. Our results show that relatively few areas within Peru can be considered well collected (Fig. 11B). *Begonia* is most diverse in montane forests on the eastern and northwest slopes of the Andes in montane forests (Figs 11A, 12), but large areas of Peruvian montane forests have no or very few collections of *Begonia* (Fig. 11B). Similarly, several *Begonia* species are very common across Amazonian Forests and high elevation grasslands, but no begonias have been collected across most of the range of these two habitats (Fig. 11B). A focus on collecting in uncollected and poorly collected areas in Peru is essential for achieving a complete understanding of the distribution of begonias in Peru.

We also note that the data void in species distribution data is not equal across species of *Begonia*. While many caulescent species of *Begonia* are conspicuous throughout the year, deciduous and in particular tuberous species are mostly only visible during the wet season. Wet season fieldwork is hazardous in much of Andean Peru and consequently rarely carried out. Anecdotal evidence suggests that tuberous begonias are extremely poorly collected. For example, the Carretera Central (central road) from Lima to the Amazon through Junín Region is one of the best collected routes in Peru and caulescent species such as *B. bracteosa* and *B. peruviana* have both been collected there tens of times. *Begonia pleiopetala* is equally conspicuous on this route but only in the wet season. Consequently, this species has only been collected twice on the Carretera Central. The data void in species distributions may be particularly stark for Andean species that are only present or only fertile during the wet season.

### Undescribed species

While we describe twelve Peruvian species in this account in addition to the 22 described and ten recorded in Peru since the last floristic account of Peruvian *Begonia*, we consider it highly unlikely that there remain no undescribed *Begonia* species in Peru. It is notable that most of the recently described

species of Peruvian *Begonia* are either range-restricted species within middle or lower montane. There remain relatively large tracts of uncollected and under collected yet intact lower and middle montane forest in Peru and we consider these the most likely areas to be harbouring *Begonia* species as yet unknown to science. In particular, while most of the montane forest in Peru is found on the eastern slopes of the main Andean cordillera, there are several smaller cordilleras to the east of the cordillera. These include the cordilleras Azul, Vilcabamba, and El Sira, Sierra del Divisor, and the Peruvian Yungas Region, all of which are very poorly collected. The geographic isolation of these cordilleras, their poorly collected nature, and in some cases their unusual geology make them excellent candidates for having undescribed species. We also highlight the northwest Peruvian relict montane forests because of their high endemic species richness (Fig. 12) and inaccessibility.

While most recently described species are from montane forest, *B. joshii* Moonlight is endemic to dry forests and *B. elachista* and *B. nunezii* sp. nov. are from Amazonian Forests. These three species have only been collected in relatively inaccessible, poorly collected areas and are all known from < 5 localities. Many species of *Begonia* are range restricted (Tebbitt 2005) but begonias are found in a relatively large environmental window within Peru. These recently described species highlight that there may be yet undescribed species almost anywhere within Peru.

**The ecology of Peruvian begonias**

**Montane forests**

In common with the *Begonia* floras elsewhere (Tebbitt 2005), most Peruvian *Begonia* species are found within humid montane forests (61 species), of which most (53 species) are found within lower, middle, or upper montane forests on the eastern slopes of the Andes (Figs 10, 12). There are also strong floristic links between the three types of montane forest on the eastern slopes of the Andes, with 27 species shared between two or more of these forest types (Fig. 12). As well as harbouring the most species, the montane forests of the eastern Andean slopes also harbour the most species found in no other habitat types. Nine species are found only within lower montane forest and a further nine are only found within middle montane forest (Fig. 12). Surprisingly, while upper montane forests support 16 species of *Begonia*, all these species are shared with other habitat types in Peru. This is surprising as the high Andes are well known for their endemic species (Kessler 2002). However, begonias are not generally cold and frost tolerant, so those species found in upper montane forests are at the upper limits of their elevational ranges.

While most Peruvian sections of *Begonia* are present in montane forests, they represent a significant centre of endemic diversity for *B.* sects. *Cyathocnemis*, *Casparya*, and *Hydristyles*. These sections have 22 Peruvian members and all but three species are found only in montane forests in Peru. These three sections are closely related and members of the Neotropical Clade 2-ii sensu Moonlight *et al.* (2018). Other members of this clade include *B.* sects. *Ruizopavonia* and *Lepsia*, which are both well represented in montane forests in Peru and elsewhere in the Andes. This strongly suggests that niche conservatism has played an important role in the evolution of this clade.

Our results also highlight the importance of the northwest Peruvian relict montane forests. Sixteen species of *Begonia* are found in these forests, of which half are not found elsewhere in Peru. This supports previous studies, which have highlighted the importance of these forests for endemic species in other families (reviewed in Weigend *et al.* 2005). We also demonstrate significant floristic connections between these forests and upper and middle forests on the eastern slopes of the Andes (seven and eight shared species, respectively, Fig. 12). This is unsurprising as these forests are ecologically similar if geographically separated.

We also note that the phylogenetic diversity of the northern Peruvian montane forests is high. Their sixteen species are representatives of six sections. This may be because northern Peru and southern Ecuador represent a transition between the floras of the northern and central Andes (Weigend 2002). Alternatively, the elevation and therefore potentially the environment of the area has remained relatively stable over evolutionary time (Weigend 2002), potentially allowing it to act as a refugium for a phylogenetically diverse *Begonia* flora. Our data do not permit us to distinguish between these scenarios but the presence of both endemics (e.g., *B. velata*) and species widespread to the north (e.g., *B. hitchcockii*) or south (e.g., *B. monadelpha*) of the zone may suggest both theories have merit.

**Amazonian forest**

Following montane forests, the highest number of species in any given habitat type are found in Amazonian forest (23 species). While this represents a significant proportion of the Peruvian *Begonia* flora (30%), this is relatively low considering that around two thirds of Peru is Amazonian Forest. Most Amazonian species of *Begonia* in Peru are widespread and are shared with the floras of neighbouring countries (e.g., *B. glabra*, *B. maynensis*, *B. semiovata*) and/or the neighbouring Peruvian montane forests (e.g., *B. albomaculata*, *B. arrogans*). The Peruvian Amazonian flora does include seven endemic species but most of these are found on low hills on the margins of Amazonia rather than in more typical, flat Amazonia (e.g., *B. elachista*, *B. scorpiocaulis*). The exception to this is the newly described *B. nunezii* sp. nov., which is found on riverbanks in southern Peruvian Amazonia. This is a very unusual habitat for a large, caulescent *Begonia* but unfortunately, we have been unable to view this species in the wild.

**High elevation grasslands**

Despite high elevation grasslands covering a large area of central and southern Andean Peru (Squeo *et al.* 2002; Oyague & Cooper 2020), they only support four *Begonia* species. None of the begonias found in the ecosystem are endemic to the habitat, though *B. anemoniflora* has only rarely been collected elsewhere. Furthermore, *B. anemoniflora* is the only high elevation grassland *Begonia* species endemic to Peru. This is unexpected as many high elevation grassland groups are rich in endemics and undergoing rapid radiations (e.g., lupins; Hughes & Eastwood 2006). We speculate that this may be because all high elevation grassland *Begonia* species are also found in surrounding habitats, including montane forests and seasonal shrublands on the eastern and western slopes of the Andes, respectively. The prevailing theory for the exceptional diversity and speciation rates of the high elevation grasslands is their island-like distribution (Hughes *et al.* 2013), but this might not be the case for species equally at home in related ecosystems.

**Seasonal habitats**

While begonias are not typically thought of as specialists of seasonal habitats, Peruvian seasonal habitats are home to a significant proportion of its *Begonia* species. Eight species are found in these habitats in Peru, with two found in semi-deciduous forests, six found in dry forests and shrublands, and three found in lomas. There is a strong relationship between the *Begonia* floras of the lomas and dry forests, with half of Peruvian dry forest species also found in Lomas (Fig. 12). This is unsurprising but confirms that all lomas *Begonia* species fall into the Dillon *et al.*'s (2011) category of species that are disjunct from the Andean cordillera.

Interestingly, there is no overlap between the species found in semi-deciduous forests and either lomas or dry forest and scrublands (Fig. 12). We suspect that this is because the Andes form a significant biogeographic barrier between the semi-deciduous forests to the east and the dry forests and lomas to the west or in inter-Andean valleys. This is reflected in the low degree of relatedness in seasonally adapted species west and east of the Andes. To the west, all species are members of *B.* sect. *Eupetalum* or *Knesebeckia*. In the east, one species is a member of *B.* sect. *Doratometra* and, while the second is a

member of *B.* sect. *Knesebeckia*, it is distantly related to members of the section found west of the Andes (Moonlight *et al.* 2018).

**Conservation of Peruvian begonias**

In this treatment, we recognise 76 species of *Begonia* from Peru including 35 endemics and assign provisional IUCN categories for 68 (89%) of them including 31 endemics (89%). This represents a significant improvement on the previous attempt to provide categories for all Peruvian endemic *Begonia* taxa (León & Monsalve 2006) as a part of an effort to provide categories for all endemic Peruvian plants. León & Monsalve recognised 38 *Begonia* taxa endemic to Peru, of which 33 were species but were only able to provide IUCN categories for ten (26%) of them. Twenty-two (58%) of the taxa considered by León & Monsalve are treated as synonyms in this account, leaving only fourteen species whose IUCN categories can be meaningfully compared between their account and ours. Of those species, we assign only three (21%) to the same IUCN category as previously, which demonstrates that taxonomic effort can have severe implications both for the number of threatened taxa known from an area and the threat categories to which individual species are assigned. This is consistent with the results of previous analyses, which show that a significant proportion of published IUCN assessments represent synonyms (Kirschner & Kaplan 2002) and we caution against IUCN assessments of poorly known groups, especially without taxon-specific expertise.

We demonstrate that 41% of Peruvian *Begonia* species are threatened with extinction. This figure is similar to that for Angiosperms as a whole: of the 52 077 species currently assessed for conservation threat, 20 883 species (40%) are considered threatened with extinction (IUCN 2021). It is perhaps surprising that Peruvian begonias are not significantly more threatened than average as the tropical Andes are considered a hotspot for conservation (Myers *et al.* 2000) and begonias are known for being a group with a relatively high proportion of range restricted species (Tebbitt 2005). There are two factors that may explain the relatively low numbers of threatened species. Firstly, eight species of Peruvian *Begonia* (11%) are considered data deficient. These species are known from very few specimens, and we consider it highly likely that further collecting work will place them under threatened categories. If all data deficient species in Peru were considered threatened, then half of all Peruvian species would be considered threatened. Secondly, the Peruvian *Begonia* flora includes almost all widespread and common South American species of *Begonia*, none of which are considered threatened. If we only consider the 37 species of *Begonia* endemic to Peru, 30 (81%) are considered threatened or data deficient (24 [65%] threatened, 6 [16%] data deficient), which we consider a more realistic estimate of the threat levels to the Peruvian *Begonia* flora.

The distribution of threatened Peruvian *Begonia* species is not even among habitat types. Twenty-six (43%) of the 61 species found in montane forests are considered threatened with extinction compared to only three (13%) of the 23 species found in Amazonia. We also note that the percentage of threatened species is relatively high in northwest Peruvian relict montane forests (38%) compared to montane forests on the eastern side of the Andes (34%). This is consistent with findings from other groups, which suggest that the northwest Peruvian relict montane forests are a disproportionately important area for rare, threatened, and endemic Plant species (Weigend *et al.* 2005). We also note that the percentage of threatened species decreases from lower (34%) to middle (26%) to upper (12%) montane forests on the eastern flank of the Andes. This is surprising as rarity is expected to increase with elevation in montane ecosystems (IUCN 2021).

While montane forests support a relatively high number of species and threatened species, other habitat types support similar or higher percentages of threatened species. The number of threatened species found in dry forests and shrublands, high elevation grasslands, and semi-deciduous forests are two, one, and one, respectively, but these represent a third, a quarter, and half of their respective floras. These may

be considered marginal habitat types for *Begonia*, so the high level of threatened species in these habitat types backs up the hypothesis that threat is more common for species in marginal habitat types (IUCN 2021).

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## Appendix. Index to numbered specimens.

Non-Peruvian and excluded specimens are omitted from the exsiccate list.

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Hoogte 3831 (peruviana)

Huamán, M. 337 (glabra); 403 (rossmanniae)

Huamantupa, I. 2325, 3089, 6536, 9369 (parviflora); 3227 (acerifolia); 4395, 6526, 9415, 9423, 9253, 10538 (bracteosa); 6462, 10481, 15831 (glabra); 6622 (peruviana); 8907 (urubambensis); 10294 (stenotepala); 11435 (chemillenensis); 12376, 14300, 15121, 15743 (rossmanniae); 15556 (maynensis)

Huaraca H., W. 110 (stenotepala); 166 (bracteosa)

Huashikat, V. 288 (glabra); 349, 505, 1532, 1014 (rossmanniae)

Huber, J.E. 1518 (albomaculata)

Hutchinson, P.C. 1189, 5966 (peruviana); 3648 (rossmanniae); 5063 (weberbaueri); 5918 (monadelpha); 6008 (parviflora); 6044 (glabra); 6301 (geraniifolia)

Iltis, H.H. 1004 (veitchii var. veitchii); 1026 (parviflora)

Infantes, J. 1498 (glabra)

Janovek, J.P. 3675 (stenotepala)

Jaramillo, J. 741 (geraniifolia)

Jaramillo, N. 166 (rossmanniae); 194, 1414 (maynensis); 1065 (albomaculata)

Jernigan, K. KAJ0166 (rossmanniae)

Jones, J. 9106 (bracteosa); 9185 (peruviana); 9319 (glabra)

Juarez, A. 703 (octopetala subsp. octopetala)

Kahn, F. 2253 (lophoptera); 2789 (fischeri)

Kalenborn, A.S. 104 (anemoniflora)

Kayap, R. 893, 963, 1081, 1385 (maynensis); 1130 (glabra)

Killip, E.P. 22326, 25613, 26118 (bracteosa); 22390, 23851, 24600, 25418 (parviflora); 22669, 23679, 23761, 24097, 24110, 24988 (bracteosa); 23668, 23713, 25003, 25157, 25370 (humilis); 24300 (lucifuga); 24514, 25542, 25595, 25632, 25844, 26097, 26108 (peruviana); 26050, 28091 (semiovata); 26101 (buddleiifolia); 26137 (arrogans); 22763, 25802, 25629, 26642, 26753, 27754, 28120, 28251, 29190, 29369, 29611, 29717 (glabra); 27174 (fischeri); 28476 (maynensis)

Klug, G. 1065, 3716 (maynensis); 1249, 3389 (fischeri); 2840, 2923 (semiovata); 3073, 3225 (parviflora); 3129 (glabra); 4296 (ulmifolia)

Knapp, S. 7482 (hitchcockii); 7485 (fischeri, parviflora); 7724 (albomaculata); 7745, 7788 (parviflora); 8026, 8027, 8192, 8441 (glabra); 8328 (geraniifolia); 8341 (octopetala subsp. octopetala)

Kujikat, A. 15, 262, 322 (glabra); 422 (maynensis)

Lechler, W. 2666 (semiovata)

La Torre, M.I. 1290, 1432 (parviflora)

Leiva G., S. 583 (octopetala subsp. octopetala); 1394 (urticae); 1596, 1668 (fischeri); 2260 (neoharlingii)

León, B. 2883 (parviflora); 2956 (lophoptera); 2985 (glabra)

Leveau, J.A. 195 (rossmanniae)

Lewis, W.H. 2284, 17352 (octopetala subsp. octopetala); 9996, 11181, 12546, 12970, 13181 (rossmanniae); 10687, 12105 (glabra); 11874 (brandbygeana); 13392, 11799 (maynensis)

Llatas Q., S. 1170 (acerifolia); 3508 (geraniifolia); 3924 (bracteosa)

Lockwood, T.E. 570 (glabra)

López M., A. 2709, 3352, 3723, 4728, 5276, 7779 (octopetala subsp. octopetala); 5325 (fischeri); 6634 (urticae); 7370 (bracteosa); 7627 (parcifolia); 7721, 7777 (acerifolia); 7898 (geraniifolia)

Lourteig, A. 3102 (bracteosa); 3117 (geraniifolia)

Luteyn, J.L. 6407 (veitchii var. veitchii)

Maas, P.J.M. 4575 (yuracyacuensis); 6096 (deltoides); 6314 (semiovata)

MacBride, J.F. 3721 (obtecticaulis); 2129, 3739, 5913 (octopetala subsp. octopetala); 3877 (cyathophora); 4143 (octopetala subsp. ovatiformis); 5914 (geraniifolia)

Madison, M.T. 10064-70 (glabra)

Maguire, B. 44416 (bracteosa); 61581 (lophoptera)

Mäkinen, Y. 1792 (humilis)

2846 (maynensis); 2856, 2861 (lophoptera); 2865 (acerifolia); 2884, 2914 (pleiopetala); 2859, 2921 (bracteosa); 2933 (humilis); 2941 (chemillenensis)

Ortiz V., E. 617, 618 (parviflora); 734 (amoeboides); 743 (urticae); 937 (peruviana)

Pearce, R. 164, 514 (hirta); 180 (cyathophora); 556 (lophoptera)

Pennell, F.W. 14050, 15641 (monadelpha); 14054 (peruviana); 14069 (lophoptera); 14126 (acerifolia); 14531 (octopetala subsp. octopetala); 14756 (geraniifolia)

Pennington, R.T. 1112, (acerifolia); 1113 (heliantha); 1271, 1993 (bracteosa); 1386 (octopetala subsp. octopetala); 1982 (arrogans); 1992 (parviflora)

Perea, J. 6, 1336, 3736 (peruviana); 77, 996, 1384, 4293 (parviflora); 245, 1687, 4334, 4546, 4589 (glabra); 813 (hirta); 1472 (amoeboides); 3515 (fischeri); 4378, 4480 (bracteosa)

Peyton, B. 391 (peruviana); 545, 1178 (parviflora); 884 (bracteosa); 1501 (parviflora)

Pipoly, J.J. 12367 (semiovata); 12154 (glabra)

Pires, J.M. 785 (semiovata)

Plowman, T. 4667 (octopetala subsp. octopetala); 4687, 7386, 11173 (bracteosa); 4967 (parviflora); 7390 (peruviana)

Poeppig, E.F. 1057 (glauca); 1063 (cyathophora, glabra, glauca); 1241 (foliosa)

Ponce, G.A. 38 (bracteosa)

Odonni, G. 332 (glabra)

Qquellón, V.H. 4 (lophoptera)

Quipuscoa S., V. 84, 1013 (bracteosa); 969, 2344 (glabra); 1015, 2039 (parviflora); 1244 (monadelpha); 1955 (foliosa); 3165, 4126 (fischeri); 3170 (serratistipula); 3320, 3943 (urticae); 3233 (peruviana); 4005 (hitchcockii)

R-Dávila, A. 20 (bracteosa)

Raimondi, A. 2982 (hirta), 12828 (octopetala var. octopetala)

Ramírez R., M. 11243 (humilis)

Ramírez V., L. 054-85 (guaduensis)

Revilla, J. 587 (fischeri); 1715 (semiovata)

Revilla M., C. 78 (rossmanniae)

Reynel, C. 5054 (glabra)

Ridoutt, C.A. 11424, 11731, 12865, 12931, 12968, 13052 (glabra); 11861 (glauca); 12115, 12116 (geraniifolia); 12202, 12891 (octopetala subsp. octopetala); 12986, 14525, 14587 (humilis); 12995, 12997, 13110, 13112 (bracteosa); 13113 (peruviana)

Ríos, M. 2833 (semiovata); 2963 (buddleiifolia); 3298 (glabra); 5262 (rossmanniae)

Rimachi Y., M. 1316, 1715 (semiovata); 2390, 5287, 8052 (glabra); 3829, 5259, 10136 (maynensis); 3855, 5243 (parviflora); 4805, 5762 (buddleiifolia); 5144 (humilis); 5230 (glabra); 7314 (fischeri)

Riva, S. 135 (pleiopetala)

Rodriguez E., M. 155 (weberbaueri)

Rodriguez R., E. 171, 1706 (peruviana); 1144, 1667 (glabra); 1900, 2996 (condorensis); 282, 543, 870, 1102 (rossmanniae); 1672 (guaduensis); 2107 (bifurcata); 2153, 2707 (monadelpha); 2251 (tumbezensis); 2720 (velata); 1114, 2746 (maynensis)

Rojas, R. 50, 331, 5702, 6278, 7659 (rossmanniae); 1188, 1205, 1234, 1242, 1568, 2438, 2589, 4169, 4333 (bracteosa); 1272, 2428, 2527, 3028, 3729, 4241, 6789, 8410 (peruviana); 1534, 1766, 1872 (peruviana); 1559, 1590 (glabra); 1777 (lophoptera); 2359, 2457 (parviflora); 2410, 2423 (monadelpha); 2443, 3101 (amoeboides); 2496, 3490 (chemillenensis); 3190, 8195 (maynensis); 3446, 5695 (semiovata); 5744 (fischeri); 8000 (pleiopetala)

Roque, J. 1626 (geraniifolia); 1667 (hirta); 1826, 1921 (octopetala subsp. octopetala); 3011 (bracteosa); 4476 (lophoptera); 4483 (parviflora); 4709 (veitchii var. veitchii)

Ruíz, H. 143 (rossmanniae)

Ruiz, J. 1167 (fischeri); 1726 (hirtella)

Sagástegui A., A. 57, 15518, 15551 (neoharlingii); 3758, 3909, 6355, 9262, 14020, 14764, 14965, 15329 (octopetala subsp. octopetala); 4258, 5070, 12629, 15405 (pseudopleiopetala); 5871 (guaduensis); 5876 (rossmanniae); 6109, 8003, 9943, 14323, 14559, 16161 (weberbaueri); 6634, 10233 (urticae); 8279, 15307 (huancabambae); 16316 (hirta); 17485 (piurensis)

Salick, J. 7038 (rossmanniae)

Salinas, I. 3, 410, 446, 7038, 7260 (parviflora); 406, 443 (bracteosa), 484, 739 (peruviana)

Salinas, N. 404 (monadelpha); 6550 (rossmanniae); 6584 (lophoptera); 6691 (stenotepala)

Samain, M.S. 146 (monadelpha)

Sánchez, T. 20 (rossmanniae)

Sánchez V., I. 2625, 5964, 8998, 9020 (parviflora); 4453, 5933, 6565 (monadelpha); 6070, 6568, 8479 (urticae); 4066, 5106, 1161 (octopetala subsp. octopetala); 2716 (parcifolia); 3696 (neoharlingii); 3991 (joshii); 4009 (geraniifolia); 4230 (tumbezensis); 4471, 9562[a] (foliosa); 5114 (bifurcata); 5122 (polypetala); 5800 (acerifolia); 8071, 8386, 10538 (glabra); 8389 (yuracyacuensis); 9562 (peruviana); 9470 (buddleiifolia); 9894, 9934 (guaduensis); 10032 (hitchcockii); 11766 (weberbaueri); 11952 (huancabambae); 12146 (acerifolia)

Sánchez V., J.G. 306, 861, 968 (monadelpha); 323 (parviflora); 461 (urticae); 870 (fischeri);

Sandeman, C. 155 (octopetala subsp. octopetala); 3584, 4558 (bracteosa); 3626 (veitchii var. machupicchuensis); 3665, 3729 (lophoptera); 3702 (semiovata); 3723 (subspinulosa); 4378 (peruviana); 4432, 5029 (glabra); 4512 (anemoniflora); 4583 (acerifolia); 5015 (humilis); 5171 (monadelpha); 5211 (parviflora)

Sandoval, M.F. 67 (octopetala subsp. octopetala)

Santa Cruz, L. 298, 1921 (fischeri); 407 (octopetala subsp. octopetala); 2106, 2113 (acerifolia); 2215 (monadelpha)

Santisteban, J. 34 (huancabambae); 80, 99 (hitchcockii)

Saunders, S.G.E. 148 (geraniifolia); 193 (octopetala subsp. octopetala); 745, 766 (veitchii var. veitchii)

Särkinen, T.E., 2205 (monadelpha); 2216 (weberbaueri); 5303 (bracteosa); 5306 (acerifolia); 5335 (veitchii var. veitchii)

Savatier, P.A. 477 (octopetala subsp. octopetala); 1396 (geraniifolia)

Schunke, J.M. 323 (semiovata)

Schunke V., J. 4447, 4950, 11028 (humilis); 2279, 5107, 10439, 15771 (albomaculata); 2715, 3343, 4067, 6083, 7168, 7828, 7901, 9702, 11820, 15758, 15796, 16136 (glabra); 5819, 5865, 16127, 16503 (rossmanniae); 5933, 15842 (parviflora); 6715 (semiovata); 9221, 11445, 11449 (bracteosa); 9321, 11435 (aeranthos); 9390 (peruviana)

Scolnik, R. 792 (peruviana); 811 (bracteosa); 854 (parviflora); 892 (rossmanniae); 908 (glabra); 927 (brevicordata)

Seibert, R.J. 2385 (urticae)

Seidenschwarz, F.G. 205/1 (humilis)

Simpson, D.R. 562 (parcifolia)

Smith, G.G. 307 (foliosa)

Smith, D.N. 1512, 2116, 2625[a], 4052, 4114, 4190, 5493 (bracteosa); 1585, 4200, 4614, 7904 (parviflora); 2575, 4446, 7641 (peruviana); 2611, 2957, 4400, 5206, 8527 (glabra); 2846, 4033 (rossmanniae); 3237 (neoharlingii); 4108, 7806 (monadelpha); 4428, 4667 (hitchcockii); 4669 (urticae); 5283, 6036 (fischeri); 6005, 7801 (amoeboides); 10585 (pleiopetala)

Smith, S.D. 374 (monadelpha)

Smith, S.F. 398 (fischeri)

Soloman, J.C. 3161 (parviflora); 3188 (peruviana); 3283 (semiovata)

Soukup, J.J. 1302, 1303, 3916 (octopetala subsp. octopetala); 1506 (humilis); 2413 (humilis); 2468, 4425 (bracteosa); 2502 (peruviana); 3750 (geraniifolia); 3876 (acerifolia); 4044 (monadelpha)

Spruce, R.E. 3945 (parviflora); 3959, 4859 (maynensis); 3960, 4826 (glabra); 3982, 3982[aa] (hirtella); 3982[a] (humilis); 3998 (buddleiifolia); 4211 (semiovata)

Stafford, D. 61 (geraniifolia); 780 (bracteosa); 1065 (veitchii var. machupicchuensis)

Stein, B.A. 2338 (lucifuga)

Steinen, Z. 1316 (geraniifolia)

Stephens, F.L. 186 (bracteosa)

Stork, H.E. 9269 (octopetala subsp. octopetala); 9859 (parviflora); 9888 (peruviana); 9895 (monadelpha); 10376 (pleiopetala); 10871 (veitchii var. veitchii); 11393 (piurensis)

Suclli, E. 957 (parviflora); 972, 1109 (bracteosa); 1222 (glabra); 2077, 2186 (veitchii var. veitchii); 2592 (lophoptera)

Sullivan, G. 845, 1123 (parviflora); 1056, 1065, 1122 (bracteosa)

Swingle, C. 67 (monadelpha)

Tebbitt, M.C. 795, 798, 804, 805, 806, 811, 812, 815, 816, 817, 818, 819, 824 (veitchii var. veitchii); 796, 799, 820 (bracteosa); 797, 810, 814, 831, 843, 847 (acerifolia); 800[a] (urubambensis), veitchii var. machupicchuensis); 801, 802 (veitchii var. machupicchuensis); 803, 813 (pleiopetala); 807, 821 (lophoptera); 808 (alto-peruviana); 809 (thyrsoidea); 822 (brevicordata); 823 (stenotepala); 825, 828, 836, 837, 841, 844, 848 (octopetala subsp. octopetala); 826, 827 (pseudopleiopetala); 829 (weberbaueri); 830 (geraniifolia); 832 (peruviana); 833, 834 (monadelpha); 838 (huancabambae); 839 (polypetala); 840 (neoharlingii); 845 (parcifolia); 846 (ludwigii)

Tessmann, G. 3854 (glabra); 4180 (maynensis); 4896 (rossmanniae)

Tillett, S.S. 672-137 (rossmanniae); 673-293 (foliosa); 673-344 (parviflora); 673-374 (peruviana)

Timaná, M. 701, 793, 814, 1115 (lophoptera); 728, 757, 787, 1063 (glabra); 2229 (semiovata)

Thomas, S. 4/1 (bracteosa)

Toribio, M.I. 120 (rossmanniae); 374 (glabra)

Torres, J. 858 (semiovata)

Torres, L.A. 415 (semiovata)

Tovar, O. 250, 5647 (veitchii var. veitchii); 1439, 2246, 2304 (bracteosa); 1441 (glabra); 3600 (octopetala subsp. octopetala)

Tuomisto, H. 121 (semiovata)

Trinidad, H. HT-4101 (alto-peruviana)

Tunqui, S. 320, 818, 1137 (rossmanniae)

Tupayachi, A. 866 (veitchii var. veitchii)

Tutin, T.G. 1256 (peruviana); 1326 (bracteosa)

Ugent, D. 5317 (bracteosa)

Ule, E. 6268 (glabra); 6466 (buddleiifolia); 6467 (maynensis)

Valadeau, C. 516 (parviflora)

Valenzuela, L. 1472, 2418, 6364, 8022, 31731 (pleiopetala); 1821, 4630, 4862, 5419, 5779, 8250, 30174 (bracteosa); 3090, 5546, 5654[a] (acerifolia); 3538, 5053, 5977, 8292 (veitchii var. veitchii); 4267 (stenotepala); 3819, 5428, 5528, 5542, 5653, 5654, 9553, 13854 (parviflora); 4778 (veitchii var. machupicchuensis); 5310, 8649, 10305, 13875, 27101 (lophoptera); 5315 (imbrexiformis); 6652 (urubambensis); 7304, 11654, 13066, 13490 (peruviana); 1222 (glabra); 7505, 7523 (longitepala); 12841, 18467 (rossmanniae); 13646 (hirta); 13842 (amoeboides); 17710 (parviflora); 30212 (chemillenensis); 30418 (urticae); 35295 (buddleiifolia); 35427 (semiovata)

van der Werff, H. 17664, 20286 (monadelpha); 17670, 17959, 18427, 18511, 20215, 21014, 21180 (bracteosa); 17805, 17838, 18503, 20222, 22667 (peruviana); 17924, 18298 (chemillenensis); 18373 (glabra); 18387, 20106 (rossmanniae); 18405 (buddleiifolia); 18425 (arrogans); 20995 (acerifolia); 21044, 21235, 21372 (parviflora); 21388 (acerifolia); 25374 (maynensis)

Vargas, M. 1 (neoharlingii); 2219 (octopetala subsp. octopetala)

Vargas C. 40, 133, 160 (bracteosa); 127 (parviflora); 161 (glauca); 163, 165, 5412 (peruviana); 1651 (glabra)

Vargas Calderón J.C. 163, 5154, 5413 (monadelpha); 1317, 9632 (pleiopetala); 1566, 3727, 11113 16063, (lophoptera); 2127, 3169, 5352 (bracteosa); 2772 (geraniifolia, veitchii var. veitchii); 3531, 7316 (peruviana); 3673 (subspinulosa); 3720 (herrerae); 4630, 8961[a] (octopetala subsp. octopetala); 5382, 7327 (parviflora); 5669, 7485 (veitchii var. veitchii); 5242, 6809, 13400, 13427, 15526 (stenotepala); 6586 (anemoniflora); 6170, 17871 (semiovata); 6767 (brevicordata); 7243 (acerifolia); 7377 (rossmanniae); 15616 (vargasii); 16417[a] (heliantha); 11845, 17597 (alto-peruviana)

Vargas Lopez, J.H. 3156 (bracteosa)

Vásquez, R. 39, 11294, 24530, 34030, 39090 (semiovata); 822, 4511, 17484, 25145, 27528 (glabra); 1936, 2290, 22103, 24592, 31606, 32090, 37188, 35567, 38006 (rossmanniae); 2452, 5230, 10171, 18984, 21472, 24030, 18402, 20250, 22336, 24352, 24934, 24937, 25057 (maynensis); 6502, 9601, 27337 (fischeri); 18929 (guaduensis); 19770, 20983, 20098 (albomaculata); 20195, 25289, 28326, 30524, 32599 (peruviana); 20863 (guaduensis); 21967, 26606, 28129, 30416, 39404,

39485 (urticae); 25291, 25258, 28105, 31140, 33417 (parviflora); 27716, 28025, 28114, 28270, 28366, 28426, 32943 (bracteosa); 28093, 36360 (lophoptera); 28268, 28323, 30447, 36239, 36330 (monadelpha); 27225 (parcifolia); 29138, 30322 (hirta); 34603 (semiovata); 35403 (amoeboides); 35740 (humilis); 36606, 37288, 37411, 37853, 40120 (chemillenensis); 36686, 40115 (buddleiifolia)

Veildhuizenm J. 1573 (veitchii var. veitchii)

Vicuña, E. 319 (parviflora)

Vilca C., S. 229 (amoeboides); 275 (peruviana); 293 (rossmanniae); 376 (glabra); 512 (fischeri); 665 (parviflora)

Vilcapoma S., G. 1138, 2219 (octopetala subsp. octopetala)

Wasshausen, D.C. 612, 653 (glabra); 665, 1082, 1102, 1105, 1134 (bracteosa); 683 (lophoptera); 881 (rossmanniae); 1093 (humilis); 1033 (buddleiifolia); 1194 (acerifolia); 1208 (andina); 1253 (semiovata); 1334 (hirtella); 1352, 1070 (albomaculata)

Weberbauer A. 46, 10081 (glabra); 483 (humilis); 503, 5622, 6402, 7906 (acerifolia); 506 (unilateralis); 1208[a], 7836, 7836[a] (subspinulosa); 1565, 1585, 6026 (octopetala subsp. octopetala); 1764, 2015 (anemoniflora); 1761 (bracteosa); 3824 (weberbaueri); 4432, 6723 (urticae); 4440, 6741, 7035 (monadelpha); 6021 (velata); 6639 (hirta); 6718 (peruviana); 6939 (rossmanniae); 7052 (glauca); 7641, 7646, 7685 (tumbezensis); 7907 (bracteosa); 7927 (thyrsoidea)

Weigend, M. 97/907 (octopetala subsp. octopetala); 2000/109 (veitchii var. veitchii)

Wells, J.D. 763 (lophoptera); 941, 963 (acerifolia); 965 (parviflora); 997 (subspinulosa); 1248 (peruviana)

West, J. 3617 (octopetala subsp. octopetala); 6440 (peruviana); 6416 (bracteosa); 7114 (stenotepala); 8025 (veitchii var. machupicchuensis)

Williams, L. 3497 (glabra); 7986 (fischeri)

Woytkowski 1246, 1272, 1375, 34489, 35265 (glabra); 110, 1484, 34491, 37023 (bracteosa); 160, 34160 (hirta); 161, 510 (lophoptera); 294, 7951[a], 34569 (monadelpha); 323, 34323 (peruviana); 339 (acerifolia); 341, 1309, 7361 (humilis); 7476 (peruviana); 8316 (urticae); 34341 (rossmanniae, yuracyacuensis); 34360 (rossmanniae); 35292 (fischeri)

Wurdack, J.J. 541, 1627 (monadelpha); 748, 890 (fischeri); 921, 1028 (hitchcockii); 1019 (peruviana); 1022 (parviflora); 1106 (foliosa); 1578, 1633 (urticae); 1902 (albomaculata); 2084 (maynensis); 2281 (semiovata); 2290 (glabra)

Xue-Jun, G. 307 (parviflora); 350, 441 (chemillenensis); 396, 493 (bracteosa); 435 (glabra)

Young, H.J. 45 (fischeri)

Young, K. 34 (fischeri); 330 (glabra); 388, 748, 785, 885, 3946, 4084 (parviflora); 599, (monadelpha); 645, 851 (bracteosa); 1250, 1292, 1545, 2094, 4196 (urticae)

Zegarra, P. 50 (bracteosa); 67 (glabra)

Unknown c21 (octopetala subsp. octopetala); 185 (octopetala subsp. ovatiformis); 601 (peruviana); 7235 (monadelpha)